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AIRCRAFT

Vol. 4 No. 1 MARCH, 1913 25 Cents a Copy

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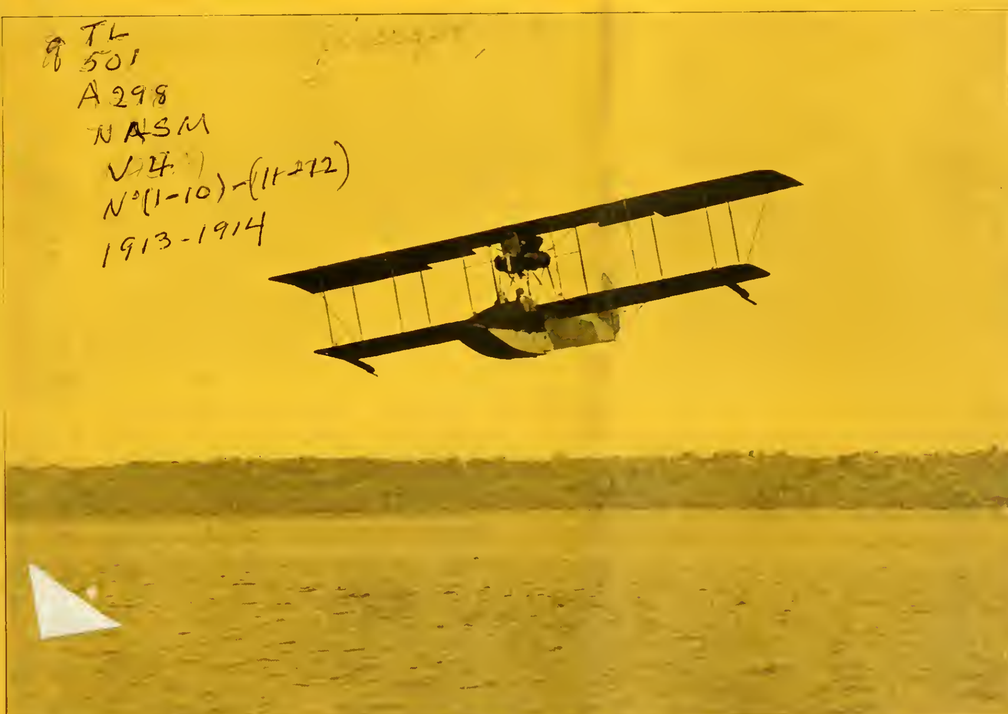

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AFTER CAREFUL EXAMINATION OF THE INNER MARGIN AND TYPE OF MATERIAL WE HAVE SEWN THIS VOLUME BY HAND SO IT CAN BE MORE EASILY OPENED AND READ.

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TO OUR READERS

AIRCRAFT is just beginning its fourth year. Our success is due, in a large measure, to the harmony existing between our readers and our writers. It has always been our chief aim to offer to the reader the product of the very greatest exponents of the movement throughout the entire world.

We have done our best to furnish facts and figures obtained only from the most reliable sources. We have refused to publish volumes of stuff, offered to us during the past, that has appeared in other publications because of its questionable nature and, therefore, useless. We consider our readers' time too valuable to waste upon erroneous information, or stuff prepared by tyros.

And so it is, because we want to increase our efficiency in every department and cover the whole aeronautical movement from top to bottom in a high class manner, that we have decided to increase the price of AIRCRAFT from 15 to 25 cents a copy, and from $1.50 to $2.00 a year. This will put AIRCRAFT on a self-sustaining basis, and absolutely free and independent of the advertiser. That means that we shall cater only to the wishes of the reader and bend all our efforts in giving him reading matter only of the most reliable and useful nature.

We believe that our clientele prefer AIRCRAFT to be a high class, reliable, self-supporting magazine, with sufficient strength and power to help the movement along, rather than a cheap, weak little paper published occasionally and containing only the ideas of embryo aeronautical writers. In other words, we feel sure that our readers want the best of everything and are willing to pay for it.

However, not to take the reader too much unawares, we have decided to allow the old subscription price of $1.50 to stand for one month and will accept that amount for a year's subscription on condition that we receive it prior to April 1st, 1913.

Or, in case we receive payment prior to April 1st, 1913, we will accept the sum of $3.00 for two years' subscription, $4.00 for three years' subscription, and $5.00 for four years' subscription. That's quite fair, isn't it?

Furthermore, following in the footsteps of all the most successful magazines of to-day, we have decided to withdraw the return privilege of AIRCRAFT from newsdealers. That means that the reader of AIRCRAFT, who has been in the habit of buying it each month from the newsdealer, must now order it in advance or he will be unable to obtain it at all. This means that we intend to do away with waste altogether, and the thousands of dollars saved each year thereby will go into making AIRCRAFT bigger, brighter and more useful than ever before.

Let us both pull together, reader, and air traffic will soon be a reality in this glorious country.

Send in your subscription before you forget it, and for as many years as you choose. AIRCRAFT is here to stay; you can aid in its growth.

THE LAWSON PUBLISHING COMPANY

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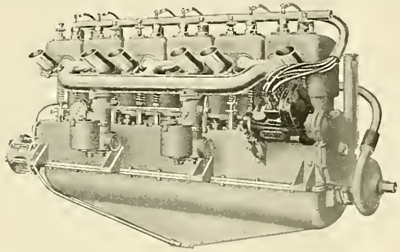
Sturtevant

Aeronautical Motors



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These motors are of the automobile type, water cooled. There is not a freakish thing about them. In construction the best materials and workmanship only are allowed, and they are rigidly inspected through each step of their construction. They give the same unfailing continuous service that a high grade automobile motor gives.

Catalog No. 2003 gives full details of their construction. Ask for it.

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TWO AERO BOAT PONTOONS---Weight 55 lbs.--- each capable of floating 800 lbs.---per pair complete $250.

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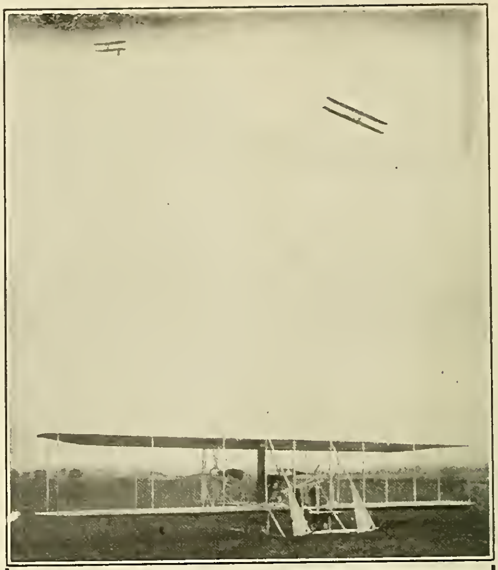
Don't fail to get our prices on Wheels and Tires. We make any size.



A New Wright Flyer

We will present this season a new model, known as Model "E," designed especially for

Exhibition Flying

This model will be equipped with either four or six-cylinder motor, turning a single propeller. It is so designed that it can be taken down for express shipment and reassembled within a few hours.

The old models, refined in details, will be continued for use of those who wish to fly for pleasure and sport.

All models may be equipped with **Hydroplanes.**

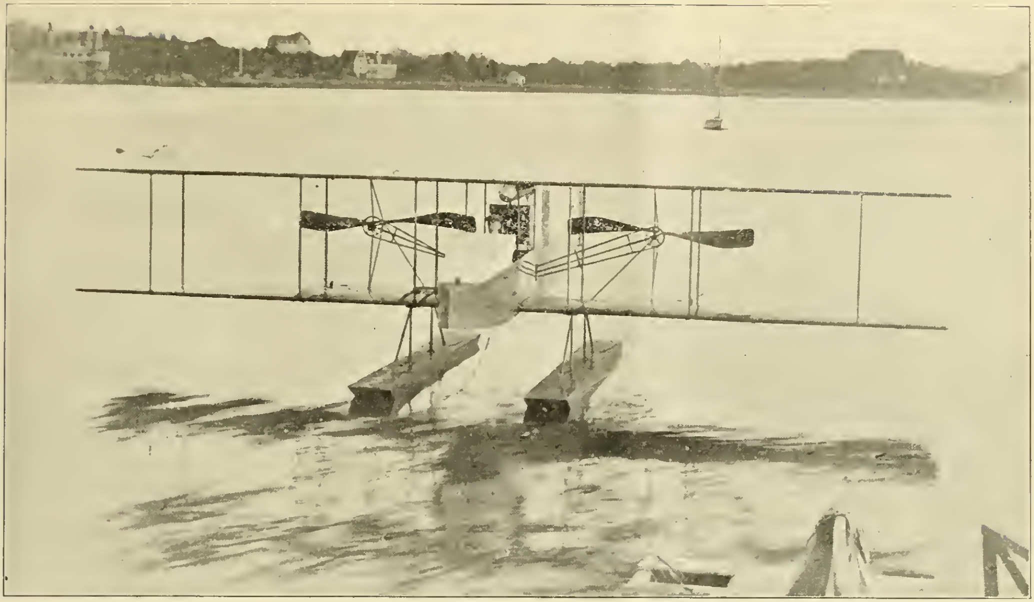
The Wright School of Aviation

Our School of Aviation will open at Simms Station (Dayton) about April 1st with a corps of competent instructors. The school will be under the personal supervision of Mr. Orville Wright. Tuition for a complete course will be $250.00. Enroll now.

THE WRIGHT COMPANY

Dept. "B" **DAYTON, OHIO**

New York Office, 11 Pine Street



The new 60 H. P. Sturtevant motored Burgess military coast defence hydro-aeroplane which recently passed the Government's tests and has been taken over by the Army for coast defence service.

As can be noticed, the new machine differs radically from usual hydro-aeroplane design in that it has a long streamline fuselage carrying the operators and motor in front and at the rear the tail and rudders. This arrangement of fitting a fuselage body in a two propeller Wright type biplane has been repeatedly advocated in AIRCRAFT, and in the November, 1912, issue, page 274, there was published an illustration of a suggested Wright type machine using a covered in fuselage, but in this case, as the machine was of the land type, the motor was placed in front to secure additional safety.

CONTENTS—MARCH, 1913

AIRCRAFT

ALFRED W. LAWSON
President and Treasurer
ERNEST C. LANDGRAF
Secretary

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Asst. Editor

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Entered as "second-class matter" February 18, 1910, at the Post Office, at New York, N. Y., under Act of March 3, 1879.

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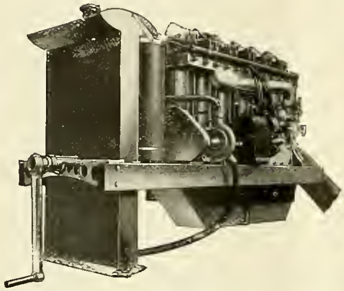
DO YOU TRUST YOUR MOTOR?



6-cyl. 60 H. P. Curtiss Power Plant

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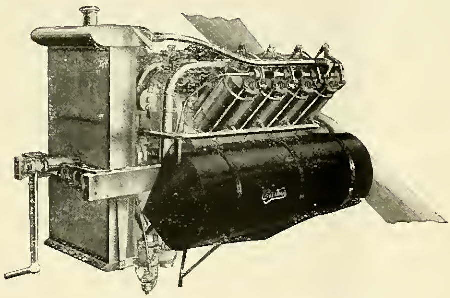
He holds the American Altitude Record, and does things no one else would attempt.

Lieut. J. H. Towers, U. S. N.
Trusts His Curtiss

And holds the American and World's Duration and Distance Record for Hydroaeroplanes.

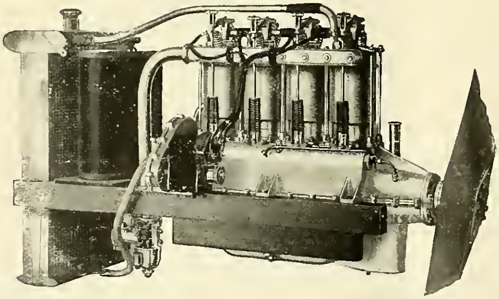


8-Cyl. 80 H. P. Curtiss Power Plant

RESULTS TELL THE STORY

No matter whether you want a motor for power, speed, reliability, or endurance, careful investigation will prove to you that Curtiss Motors are years ahead of all others.

Used by the Governments of the United States, France, Russia, Germany, Japan, Italy, Austria, Brazil, et. al. Only adopted by them after most severe tests.



4-cyl. 40 H. P. Curtiss Power Plant

There's Always a Reason

If you are building your own machine, if you manufacture machines for others, if you are interested in any way, we want to send you the advance catalog of Curtiss Motors for 1913 and explain why **Curtiss Motors Lead the World.** Ask for it to-day.

CURTISS MOTOR COMPANY
25 Lake Street, Hammondsport, N. Y.

AIRCRAFT

Vol. 4. No. 1 | New York, March 1913 | 25 CENTS A COPY $2.00 A YEAR

EDUCATE CONGRESS AND NEWSPAPER EDITORS

By ALFRED W. LAWSON

My recent message to Congress, a separate copy of which was sent to each member of the House of Representatives, the United States Senate, the President of the United States, the Speaker of the House of Representatives, the Secretary of War, the Secretary of the Navy, and other important personages, the full contents of which was published in the February number of Aircraft, has had the effect of creating some considerable interest in the movement, and begun an intelligent discussion of the subject in quarters heretofore absolutely impenetrable, and has opened a passageway through which, if followed up persistently by those who are interested in aeronautical development, will lead to the very heart of the opposition to air transportation.

It is reasonable to suppose that out of the 700 copies of the message sent to Washington that at least five or six hundred of those in power have read and considered the facts and arguments set forth therein. It is just possible that the entire 700 recipients read the address.

This message, which by the way, was published either whole or in part in almost every important newspaper in the United States, is merely one shot directed toward the armor plate of the opposition to aeronautical progress, and in order to reap any substantial benefits therefrom, we must follow it up with not only one shot or two shots, but with a continual bombardment of broadsides, as it were. We must combine our efforts to fight the opposition intelligently. Combination is the fundamental law of strength and an old saying is that "might is right," therefore we must combine for strength and use might in our attacks in order to accomplish anything worth while.

Aircraft can be utilized as a great gun directed against the opposition and the size of its shells and the power of their penetration can be demonstrated through its readers, who must act as the ammunition, so to speak.

The time has now arrived for the great army of Aircraft readers to begin a powerful onslaught against the citadel of the opposition; to intelligently unite into one great all-conquering force that will eventually break down the enormous barrier of ignorance which now stands between useful air traffic and success.

Ignorance is to-day what it has always been—a wall of gigantic proportions, deeply and firmly set and standing directly in the path of all progress. During the past this mammoth wall has stood in the path of all enlightenment of any nature whatsoever and the precursors of progress have had to literally batter it down piecemeal before they could put into concrete form their new and useful methods.

It would require volumes to cite all the cases in history in which men were forced to give their life's blood in the fight against ignorance and prejudice, but we only have to look back a few years and consider the hardships experienced by the forerunners of the steamboat, of the railroad, of the automobile, of the telegraph, of the telephone, and many other useful inventions which are now so important to our daily life, in order to understand just exactly what difficulties the pioneers of air transportation must pass through to bring the people, as a whole, up to that point of progress to which we have reached.

So we must not expect that the work will be easy; on the contrary, it will require the hardest sort of struggles imaginable. We must not expect either, that the movement is going to grow up like a mushroom in a night. We must give it time to take root in order that it does not topple over with the first blow of the opposition.

Therefore, Aircraft and its large and powerful army of readers must fight against ignorance. This ignorance we will find in the Halls of Congress, in our State Legislatures, in our Universities, in the editorial rooms of our newspapers, and elsewhere, and the greatest force to use in this fight is education. We must educate Congress, we must educate the Legislature, we must educate those in control of the Universities and schools, and we must educate the editors of newspapers.

Letter from Champ Clark, Speaker of the House of Representatives

WALLACE BASSFORD SECRETARY
CLARENCE A CANNON CLERK

CHARLES R CRIS
PARLIAMENTARIAN

THE SPEAKER'S ROOM
HOUSE OF REPRESENTATIVES
WASHINGTON D C

January 21, 1913.

Mr. Alfred W. Lawson,

New York City, New York.

My dear Mr. Lawson:

I have your letter enclosing your recommendations concerning the necessity of an American aerial fleet.

Under the rules of the House they can not be read but any gentleman can have them printed in the record as a part of his remarks.

I will have them introduced and referred to the proper committee, but this does not involve printing in the Record.

Your friend,

Champ Clark.

The following letter from Congressman W. G. Sharp shows that the aeronautical movement has at least one real champion in the House of Representatives who is willing to sacrifice his reputation in the interest of air traffic:

COMMITTEE ON FOREIGN AFFAIRS
HOUSE OF REPRESENTATIVES. UNITED STATES
WASHINGTON D C

Feb. 1st, 1913.

Mr. A. W. Lawson,
C/o "Aircraft",
37 East 28th St.,
New York City.

My dear Sir:-

I have your favor of the 27th ult. enclosing your letter of "recommendation to Congress". I note your request that I take leave to have printed in the Record this recommendation, and in reply will say that I shall be glad to do so at the first appropriate opportunity. Unless there is some urgency for this, I think it might be well to wait until the naval appropriation bill comes up for consideration - possibly I may find a convenient opportunity to do so next week when Representative Hobson's bill for the creation of a "Council of National Defense" which may come up then for consideration. In any event, I shall be glad to make the request, for I think it will be a valuable contribution to a discussion of the subject which I have, at the risk of being called a crank upon aviation, repeatedly brought to the attention of the House. Upon two occasions within the past few weeks I have sought to ingraft some aviation features upon the appropriation bills which have been passed by the House, and I take pleasure in sending you portions of the Congressional Records which contain my remarks.

I might add that I have had for some time under consideration the introduction of various bills providing for the practical use of the aeroplane or other aircraft in various fields of operation by the Government which, if they are favorably considered, will avoid all points of order as to being new legislation when these appropriation bills will again come up for action.

Let me take this opportunity to ask that you place my name upon your mailing list for "Aircraft", for which I enclose my check for $1.50.

Very truly yours

W. G. Sharp

There is a notion existing in the minds of many people that the newspaper is the great educational force. We question this very much when we scan the back files of newspapers and find that their editorial columns have almost always been used to belittle new discoveries, and all one has to do to realize the correctness of this statement is to read what the newspapers had to say about the telegraph, telephone, electric light, the screw wheel of a steamship, the railroad, the automobile, etc., before the value of those great public utilities had actually been proven. They said exactly what they say to-day in opposition to air transportation. So we do not consider that newspapers educate the people when they oppose all new things.

A newspaper, as a rule, is merely a reflection of public opinion; it is not an educating force in its highest sense. It merely gives its readers what they clamor for. If the public want sensational and degrading reading matter, they supply it, no matter what the effect may be upon the public. We do not consider such a policy beneficial any more than we consider that the manufacturer of whiskey is a public benefactor because he furnishes whiskey to the drunkard who wants it, or the manufacturer of opium because he furnishes opium to the opium fiend who wants it.

The great majority of people do not want to use their energy in thinking of to-morrow. To-day is good enough for them and in most cases yesterday is even better, and so the policy of the newspapers is to tell them what happened to-day or yesterday, leaving to-morrow to take care of itself; in fact, almost refusing to believe that there is to be a to-morrow, and that is the drawback progress must fight. We must show them that to-morrow air transportation will supersede land and water transportation to a large extent, just as to-day the railroad and automobile supersedes the ox cart and the one-horse chaise, and just as the steamship supersedes to a large extent the sail boat of yesterday.

Now, if every reader of AIRCRAFT will become a teacher and use AIRCRAFT as his text-book, a great work can be methodically accomplished within the next year or two and some wonderful strides can be made in the progress of the movement. Each one should feel that the development of the movement rests upon his individual shoulders and must set out to make converts to the cause. The greatest and most useful converts to the cause are (1) members of Congress, (2) editors of newspapers, (3) capitalists.

The reader should begin this educational work by writing a strong letter to his congressman and, incidentally, to as many other congressmen as he chooses, in support of a large aerial fleet of both aeroplanes and airships, and, furthermore, he should get as many of his friends as possible to do likewise. Next, he should go and see his home newspaper editor and try to enlighten him on the subject by bringing to his personal attention the actual facts and figures of the movement, and whenever he sees a misstatement made he should call the editor's attention to the error and have him rectify it; and next he must see that all important literature on the subject is sent to the capitalists of his community so that in time they may become educated to the fact that air transportation offers unlimited opportunities for investment to those who enter the field first.

The work must be kept up constantly and concentrated within a certain sphere, for as everyone knows a drop of water continually dropping upon the same spot will eventually bore through the hardest stone.

Teach them the difference between an aeroplane and an airship as you would teach a child who does not know. Explain to them the entirely different phases of usefulness which these two distinct types of air vehicles are fitted for. Explain how the great passenger-carrying ships of the future will eventually evolve from our present rigid type dirigible (airship), as the rigid type dirigible evolved from the non-rigid dirigible, and just as the non-rigid dirigible evolved from a spherical balloon. Then explain how great and useful service will be brought about by the further development of the aeroplane, which will become the practical runabout of the air, and teach them how our present aeroplane has evolved from the kite through various stages of gliding machines, etc., to its present state. Explain to them how the aeroplane will do, to a large extent, the work now being done by our motor boats, automobiles and other small vehicles, while the airship will do the work of our steamships, steamboats and railroads combined.

Precede such information, however, with facts already demonstrated; show them the lines of development and endeavor to convince them of the fallacious supposition that man's progress in air transportation must end in its very inception. As stated before, do not expect to make a convert of a man in a day: keep after him with small doses of startling facts and sound argument until he can understand the subject as you understand it.

The rising generation will prove to be the most fertile field for the reason that the mind of the young has not been walled in by old methods and, still retaining its elasticity of movement, is capable of grasping new ideas, whereas the passing generation, having reached the apex of mental development, merely feeds or exists, as it were, upon those ideas which are apparent and easily digested.

Teach the young mind how his success lies in the future and that to be successful he must study the wants of the future and prepare himself now with knowledge and experience and thereby

grow up as an integral part of a future industry. Explain to him how all the present great industrial giants were among the first to take up their particular lines of work, getting a good start before the crowd arrived, and that to be a great captain of the aeronautical industry in the future he must build his foundation now before the crowd arrives. The hind sight of the majority permits the precedence, pre-eminence and the power of the foresighted minority.

It is the intention of the writer to follow up his recent message to Congress by sending each member of the House of Representatives and the United States Senate a copy of the February number of AIRCRAFT on or about the 15th day of March, and if about the same time all of our readers will send letters to their congressmen requesting them to consider and support the recommendation for an appropriation of ten million dollars for the purpose of creating a great American air fleet, I am sure that incalculable good will result therefrom. And then do not let it stop at that, but keep after them. It would not be a bad idea for each reader to send his congressman a copy of AIRCRAFT each month, or better still send in a year's subscription for him.

I am reproducing as a part of this article letters received from Champ Clark, the Speaker of the House of Representatives; William G. Sharp, a member of the Foreign and Military Committees of the House of Representatives; Charles Hilles, the Secretary to President Taft, and Captain W. Irving Chambers, U. S. N., which are answers to my personal letters calling for immediate aerial action.

This is the first time to my knowledge that Champ Clark has shown any interest in the movement at all and I feel sure that with a little more time and argument it is possible to get the great leader of the House of Representatives thoroughly interested in the cause.

At the present time we have one good reliable fighting champion in the House in the Hon. William G. Sharp, of Ohio, who has already made several strong speeches on the floor in favor of aerial navigation and, as can be seen from his letter, he intends to stick to the job.

The letter from the Secretary of the President of the United States is self-explanatory.

Unfortunately, the Secretary of the Navy did not answer my letter, but gave it to Captain Chambers to answer, and his reply is included in this article and can be judged at its face value by the reader.

Captain Chambers thinks that an appropriation of $150,000 is sufficient, whereas I think $10,000,000 is not enough; that is the difference of our opinions. In his letter he commends my zeal, but said that my scheme is impracticable. He did not state exactly what was impracticable about it, but no doubt feels that it is impracticable for the United States to expend as much money in an air fleet as other countries have already done.

Germany has already spent considerably more than $20,000,000 in aeronautical development up to the present time and intends to spend another ten millions in the near future on its air fleet. Since when, I should like to know, has it become impracticable for America to keep up with German progress? I recommended two airships of the Zeppelin or Schuette-Lanz type, three airship sheds and 150 aeroplanes to be built during the year of 1913 for the United States. What is impracticable about that when Germany has already either built or ordered 400 aeroplanes and 30 dirigibles, 10 of which are real air armorclads, and 9 great military sheds, and according to the most authentic reports received during the past month they intend to add more than 200 aeroplanes and 15 new dirigibles to their already great fleet within the next year.

Of the 15 new dirigibles five have already been ordered from the Zeppelin company and from the Schuette-Lanz. Also two new Parsevals and one Gross have been ordered.

The Zeppelin Company, by the way, is now preparing to double the capacity of its plant, and not only is Germany making these great progressive strides but our reports during the past sixty days, since my first table of aerial fleets and expenditures was made up, show that every country mentioned in that table, except the United States, and many new countries not mentioned, are

President William H. Taft's answer through his secretary Charles D. Hilles, to a letter asking him to lend his aid toward establishing a great American air fleet as outlined in Alfred W. Lawson's recent message to Congress:

THE WHITE HOUSE
WASHINGTON

Personal.

JJanuary 24, 1913.

My dear Sir:-

In reply to your letter of January 23rd, I am sorry to have to say that it is not possible for the President to meet your wishes in view of the pressure under which he is working just now. I might add that his keen interest in the subject of aviation is evidenced by his recent action in creating a Commission on Aerodynamical Labratory.

Sincerely yours,

Secretary to the President

Mr. Alfred W. Lawson,
37 East 28th Street,
New York City.

The letter sent to George Von L. Meyer, the Secretary of the Navy, by Alfred W. Lawson, was referred to Captain W. Irving Chambers, whose ideas on the subject are incorporated in the following note:

ADDRESS BUREAU OF NAVIGATION NAVY DEPARTMENT, AND REFER TO NO.

N-13/I.

WASHINGTON, D. C.,

Jannary 29, 1913.

Mr. Alfred Lawson,
The Lawson Publishing Co.,
37-39 E. 28th Street,
New York City.

Dear Sir:

Your letter of January 27, 1913, to the Secretary of the Navy, forwarding a copy of your published recommendation to Congress, has been referred to me for reply.

My opinion is that your zeal is commendable, but that your scheme is impracticable.

If I can obtain legislation on the Aerodynamical Laboratory proposition and the bill to appropriate $150,000 to cover a real competitive test and purchase of Navy machines with the award of suitable prizes, I will consider that we have good cause for congratulation and that this will be amply sufficient for the Navy at present.

Very truly yours,

W. Irving Chambers

Captain. U. S. N.

preparing for the acquisition of great numbers of both aeroplanes and dirigibles.

Austria in the last sixty days has ordered about 100 new aeroplanes and a Zeppelin airship, and up to the present time has expended over $5,000,000 in aeronautical work.

Russia, during the last thirty days, has ordered over 100 new aeroplanes and five non-rigid dirigibles. Russia to date has spent over $12,000,000 in aeronautical work.

Even poor old dilapidated China has just announced her intention of having a great fleet, and is now ordering large quantities of aeroplanes from French builders. The military adviser of the Chinese Government, Major Brissaud Desmailles, a Frenchman, has suggested it, so the aerial fleet of China will be entrusted to French officers.

So again I ask, why is it impracticable for the United States of America to keep up with the progress made by Germany, France, Russia, Austria and China. Perhaps Captain Chambers knows the reason, but I must confess that I do not.

So important has the air fleet become to Germany that the German government is now considering the appointment of a new under secretary of state attached to the Ministry of the Interior, to deal with aeronautical matters. This becomes necessary, owing to the vast quantity of work which will be entailed when the legislation for regulating air traffic, which is now being prepared, is passed.

It might be well for the United States Government to follow in the footsteps of Germany in this respect, as from the tone of Captain Chambers' letter it becomes clear that the air traffic question is not being set forth to those in power in proper relation to its actual importance. Those in the saddle are apparently using infants' instead of men's arguments and methods. Why, for instance, should Congress see anything of importance in a movement whose emissaries ask for but $150,000? It is, no doubt, owing to such picayune requests that Congress has treated the whole subject heretofore with such penurious contempt whenever the matter was considered.

There can be no doubt that the addition of a new secretary to the Cabinet who would have charge of aerial affairs in this country, would be a great step forward, for the reason that such a man would give all of his personal attention to that particular department instead of coming under the jurisdiction of men in other branches of the government who have axes to grind in other directions when it comes to asking for appropriations.

A movement started recently for the purpose of introducing a bill in the New York State Legislature to provide for the establishment of a flying corps for the National Guard, seems to be a movement in the right direction, and if the various legislatures in the different States can be educated up to the point where the State Guard will become an aerial adjunct to the Federal forces, much good will result, and for that reason I am advising the readers of AIRCRAFT to educate their various assemblymen and State senators and Governors in air matters.

In the table of aerial fleets which I am incorporating in tabular form in this article, some remarkable changes have taken place within the last few weeks in the number of aeroplanes and dirigibles possessed by and the amounts expended by the different governments. In this estimate I give the aggregate amount spent by the various countries either through their army or navy for aeronautical work during the past five years in addition to new appropriations for this year and the full number of aeroplanes and dirigibles either purchased or ordered, whether antiquated or otherwise.

This estimate brings the total number of machines bought by the United States Government up to the present time to 25 machines, as follows:

The Army:—Burgess Wright, 3 land machines and 1 hydroaeroplane; Curtiss, 3 land machines and 1 flying boat; Wright, 8 land machines, also the original Wright aeroplane, which is now in the Smithsonian Institution; making 17 altogether for the Army, and adding to these 8 machines for the Navy makes a total of 25. If we add to this number 3 new machines which the Army intends to purchase before July 1st, it brings our estimate up to 28 machines altogether purchased during the past five years or already ordered. The estimate given for the government aeronautical expenditure is $435,000, made up with items as follows: $100,000 appropriated on August 24, 1912; $125,000 appropriated on March 3, 1911; $30,000 allowed by the Board of Ordnance for the purchase of the first Wright biplane in 1908, and $80,000 used to purchase the Baldwin dirigible in 1908, and building the hydrogen generating plant at Fort Omaha, free balloons and their equipment, etc., bringing the Army expenditures during the past five years up to a total of $335,000, and allowing $100,000 as the amount spent in the Navy during that time makes the grand total $435,000.

Owing to the continual addition of more aeroplanes, dirigibles and appropriations, in some instances in which it requires months to authenticate, the table must be considered nothing more or less than an estimate; but it serves the purpose of showing just what the different governments have done and are doing and the relation of their strength one to the other. And this table should be used liberally in the arguments our readers set forth in favor of air traffic.

While it was not a difficult matter to arrive at a fair estimate of French expenditures owing to the fact that each year they have publicly announced the amounts spent for both aviation and aerostation, still, on the other hand, it was not so easy to arrive at a fair estimate of German expenditures.

The figures given out from France, from 1909 to 1913, total about $14,000,000 for aviaton and $8,000,000 for aerostation, making $22,000,000 altogether. But while France proclaims to the world as loudly as possible just how strong she is aerially,

Estimate on the Total Expenditures of the Different Governments for Aeronautical Work During Five Years Approximates $100,000,000

Country	Government aeroplanes	Government dirigibles	Government expenditures
1. Germany	400	30	$28,000,000
2. France	400	25	22,000,000
3. Russia	300	18	12,000,000
4. Italy	200	10	8,000,000
5. Austria	160	8	5,000,000
6. England	100	6	3,000,000
7. Belgium	100	3	2,000,000
8. Japan	80	5	1,500,000
9. Chili	20	3	700,000*
10. Bulgaria	80	0	600,000
11. Greece	80	0	600,000
12. Spain	30	2	550,000
13. Brazil	18	3	500,000*
14. United States	28	1	435,000
15. Denmark	20	1	300,000
16. Sweden	20	0	250,000
17. China	20	0	225,000
18. Roumania	14	0	200,000
19. Holland	12	0	150,000
20. Servia	10	0	125,000
21. Norway	8	0	100,000
22. Turkey	8	0	90,000
23. Mexico	7	0	80,000
24. Argentine	6	0	75,000
25. Montenegro	4	0	40,000
Totals	2,125	115	$86,520,000

PUBLIC SUBSCRIPTION

1. Germany	$ 3,500,000
2. France	2,500,000
3. Italy	1,000,000
4. Russia	100,000
Total Public Subscription	$ 7,100,000
Total Government Expenditure	86,520,000
Grand Total	$93,620,000

Although no figures are given for spherical balloons, still the expenditures include the cost of them as well as including hydrogen plants, dirigible sheds, aeroplane hangars, and, in fact, everything necessary for both the equipment and operation of the governmental service, whether for the lighter-than-air or the heavier-than-air variety.

* The figures for Chili and Brazil were received from newspaper dispatches stating appropriations were already in hand, but we have not as yet been able to authenticate them.

ALFRED W. LAWSON.

Germany, on the other hand, tries to minimize and keep under cover her real strength. So instead of publicly stating her exact expenditures she has merely put down very small figures for aerial service, but allowed tremendous sums in her budgets (army and navy) for "extraordinary expenses," and it is from those "extraordinary expense" allowances that Germany has been quietly spending millions upon millions of dollars for the development of her air fleets without exciting too much attention from other countries. So while she cannot conceal the fact that she now has in her possession, or has already ordered, about the same number of aeroplanes as France and that her aviation department is developed on about the same plane as that of France, in making up the estimate I allow Germany $14,000,000 for aviation, the same as France, and $14,000,000 more for aerostation, the great difference in the total expenditures therefore lies in aerostation, in which Germany is far ahead of France.

Compliments of Wm G Sharp
Washington D.C. Feb 17 '13.

Germany has in her military possession 8 dirigibles of over 10,000 cubic metre capacity, whereas France only has one—the Spiess Rigid—of 11,000 cubic metres capacity, and which so far has not proved available. France has not one dirigible, therefore, that can compare with the great Zeppelin and Schuette-Lanz rigid type airships, neither in size nor efficiency; and, moreover, the German government is spending far more money in military sheds and in meteorological experiments than France, so I do not think that my estimate allowing Germany $14,000,000 for expenditures in aerostation, or $6,000,000 more than France, is exaggerated.

The fact of the matter is if we should include Germany's $3,500,000 public subscriptions to the government expenditures, it is quite possible that the total expenditures for the past five years and including what has already been decided upon to be spent this year, would be much nearer $40,000,000 than $28,000,000, so that my figures as a whole are really very conservative.

It must also be understood that while the German government have 30 dirigibles either built or now being constructed, that there are 14 private dirigibles that can be pressed into military service in case war broke out as against 5 privately owned French dirigibles, and again out of the privately owned German dirigibles 4 are above 10,000 cubic metres' capacity, while none of the privately owned French dirigibles reach that capacity, so that in case of war there could be no question concerning the relative value of the German and French air fleets. The Germans would outclass their rivals.

There are two combinations of great nations now facing each other in Europe: on one side is Germany, Austria and Italy and on the other side France, Russia and England, and owing to the Balkan disturbances there is a possibility that these two combinations may yet be arrayed against each other in actual warfare. Such an event would demonstrate once and for all time the great utility of aircraft in war and show its wonderful possibilities in peace, for these six countries possess the greatest air fleets extant.

The reader could spend much time in making calculations according to the figures of my table, trying to forecast just which combination would prove the strongest in the air, and it is a certainty that whichever combination won in the air would be the final victors and masters. The great war generals of the future will be, all other things being equal, the men who are the best versed in airology in the fullest sense of the word. . . . .

The men who control the aeronautical industry of the future will be the greatest men of their times and in proportion to our present "captains of industry" will loom up as giants to pigmies.

POSTAL TELEGRAPH — COMMERCIAL CABLES

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Cs Washn Dc Feb 17-13 FEB 17 1913

Alfred W. Lawson,

Prest, Care Aircraft, 37 E 28 St Ny City

I am pleased to inform you that the house gave unanimous consent today for printing you recent article on aviation on the record will send you copy tomorrow

Wm G Sharp M C.

As the above telegram indicates, at the request of Hon. Wm. G. Sharp, of Ohio, the House of Representatives unanimously consented to the printing in the Congressional Record Alfred W. Lawson's "Recommendation to Congress," as published in full in the February issue of AIRCRAFT.

In making his request, Mr. Sharp, among other things, said: "I deem this request not inappropriate at this time, inasmuch as the subject of aerial navigation as it concerns a means of national defence and attack will be, I believe, one of the features of the forthcoming Naval Appropriation bill. Other bills involving different phases of this subject are also in course of preparation and will claim our attention during the next Congress. I believe his (Mr. Lawson's) suggestions are timely and of much value, not only to Congress, but to the country at large. Indeed, I believe Congress is fast coming to appreciate the importance of this new field of enterprise in its varied possibilities."

The Drzewiecki tandem monoplane which has been designed to secure inherent longitudinal stability. It is attracting considerable attention, but has not as yet proved a success.

FOREIGN NEWS

BY

Arthur V. Prescott

News From Asia

(Special Correspondence by A. F. B. Silva-Netto.)

Mr. A. Kouzminsky, the famous Russian aviator, after having made a series of successful flights in Vladivostock, Harbin, Mukden, Tienstein, Peking and Hankow gave a splendid exhibition flight in Macao, on Sunday afternoon the 8th instant. Every arrangement was made and the traffic was well regulated. Mr. Kouzminsky was courteously received in Macao, and His Excellency the Governor and the military and civil authorities gave him all the facilities to make his meeting a success. A small detachment of ambulance corps men were scattered about in the vicinity over the hillsides as a precautionary measure and five lines of picket guarded the aerodrome.

After some preliminary rehearsing of the six soldiers who were to hold on to the machine until the signal was given to let go, Mr. Kouzminsky started at 3:40 P. M. and after a run of about 30 yards rose in the air with great ease. The aviator, who made three great circles of about 2 miles diameter and rising to an altitude of about 800 feet, made a superb bird-like landing on the very spot from which he started, amidst great applause. It was a glorious day, but the wind was rather puffy when about 500 feet high, causing the machine to swerve slightly. The aviator made two graceful dips, which were somewhat involuntary on account of the "wind holes" and the increasing force of the wind, which was blowing N. N. E and at about 15 miles an hour in the upper space.

It was a very rare spectacle in Macao; in fact, it was the very first flight ever made in the old Portuguese colony. It was in every way a distinct success. It was well patronized and every point of vantage was availed of by the multitude of Chinese who had collected on the rock-bound hills to witness the wonderful scene of the machine bird in the air. The hillsides were literally packed with humanity and half of the colony must have been stirred out of their homes and occupations to gaze at the human bird.

Perhaps I may add, for the information of your readers, that Macao was occupied by the Portuguese settlers, the pioneers of the Far East, as far back as 1557, and is the oldest European colony in China.

Mr. Kouzminsky in Hong Kong.—The first exhibition of a monoplane flight in the colony took place at Shatin on Saturday, the 14th inst., when Mr. Kouzminsky made a most successful ascent and descent on his Blériot monoplane. It was an ideal day for an aerial exhibition, there being hardly any strong breeze to speak of. The weather was rather cloudy and calm. The machine, after having taken a run of about 60 yards on the soft ground on the seashore, soared high into the air, rising higher and higher as he proceeded seaward for some distance, and then turned towards the spectators. The aviator made two large circles and remained in the air for about 17 minutes, the approximate altitude being about 2,500 feet. The aviator said he encountered a very cold wind at that height and jokingly said he nearly lost his way back. He descended gradually and gracefully and very adroitly alighted within a few yards from the starting point like a big magpie, and there was not the slightest jarring effect on the chassis as he touched terra firma again. He was very heartily applauded on stepping out and congratulations of many interested spectators were showered upon him. The meeting was held under the distinguished patronage of His Excellency the Governor Sir Henry May and Lady May, and the working of the monoplane was explained to Lady May, who had also stepped forward to offer her congratulations to the aviator. To give an idea of what a *wind* the propeller *could raise*, the beautiful motor was set in motion and many hats were set flying by the draught.

Mr. Kouzminsky made another superb flight on the following day, Sunday, the 15th instant. Beautiful weather prevailed and there was again another large gathering of Europeans present, but there were only a few Chinese present, the Russian aviator being boycotted by the latter. The sun was shining brightly, but the wind was rather strong and tricky, which prevented the aviator from making a higher flight. The aviator went up into the air for about 7½ minutes, and after going twice around the valley and keeping himself in full view of the spectators, returned to the spot where he started and was greeted with general applause.

The show was in every way a success, and the aviator, having gone so far as to promise to return the money should he through some accident be unable to fly. The thousands of Chinese who were expected to be present were conspicuous by their absence on both occasions, having carried their hostility to Russia in connection with the Mongolian affair to the absurd and ridiculous extent of unanimously abstaining from witnessing the very rare spectacle of an aeroplane flight because the aviator was a Russian.

The machine used was a racing Blériot made in France, fitted with a 50 H. P. Gnôme 7-cylinder motor. On a cross bar in front of the fuselage there is a brass name plate bearing the record in Russian that the monoplane had won first prize in one of the aviation meetings.

Mr. Kouzminsky started to take an active interest in aviation in 1910, after being in Paris in the Ecole Blériot and having obtained his pilot certificate he returned to Russia in May, 1910. Unfortunately he met with a serious accident whilst flying in St. Petersburg, and had to be confined to hospital for 3½ months, his right leg and arm being badly injured. Nevertheless, the accident did not dampen his ardor and he continued to take further interest in aviation and perfected himself after attaining such costly experience.

Mr. Kouzminsky gave aerial exhibitions in 83 cities in Russia, before coming out to the East, and he should certainly be placed in the front rank of aviators who have done such good work for the cause of aviation. He does not believe in fortune and fame, and he is a careful flier and will take no undue risk. He has decidedly demonstrated the possibility of human flight to many who have hitherto not believed in it. There is no necessity for any fancy evolutions in the air, such as spiral glides, dangerous dips, dutch rolls, etc., to show the people that a heavier-than-air machine can fly. These fancy flights not only endanger the lives of aviators, but also retard the progress of aviation.

Perhaps it may not be out of place to mention that Mr. Kouzminsky belongs to the Russian aristocracy, being a nephew of the famous Russian writer, Count Tolstoi.

To Count Tolstoi the following passage is accredited. Mr. Imanoff, another famous Russian aviator, asked the Count whether he would care to see an aerial flight. The old gentleman replied in the negative, knowing of the accident that had befallen his nephew. He said that he would not like to see man fly because man cannot fly, only birds can fly.

Mr. Hahn, the aviator's advance agent, left for Bangkok, and Mr. Kouminsky, his manager, Mr. G. G. Shishkin, and two mechanics, left for Haip-

The above picture shows AIRCRAFT's famous Asiatic correspondent, A. F. B. Silva-Netto, with a copy of AIRCRAFT in his hands, at the Kouzminsky aviation meeting held at Shatin, China. It will be noticed that the Chinamen, both young and old, were there in crowds and took considerable interest in the tuning up of the aeroplane prior to making a flight.

hong on the 17th inst., to give exhibition flights there. The aviator's itinerary includes Hanoi, Bangkok, Java, Malacca, Singapore and Colombo, after which he returns to his homeland.

There is admittedly a certain amount of danger in traveling, as the machine is liable to much rough handling, and besides the constant fixing up and dismantling may cause some screws or bolts and nuts to get loose. It may be mentioned that the intrepid aviator is using the same monoplane since the accident which took place in May, 1910, when the propeller, the main planes and the front part of the fuselage and landing gear got badly smashed.

Mr. W. B. Atwater was present in Macao, and witnessed Mr. Kouzminsky's flight there, and left on the 11th inst., together with his manager, Mr. Frank Putney Haight, per S. S. "Princess Alice," for Singapore, where he expects to make some flights. Mr. Atwater authorizes me to state that he has received the Governor's permission to fly here. The famous American aviator hopes to be back here early next month, when exhibition flights will be made on his hydro-aeroplane, after which he will go over to Manila, P. I., and fly during the carnival there.

Japan.—Mr. Tsuzuki, a Japanese aviator who has been experimenting with an aeroplane near Tokyo, met with an accident when about a mile and a half from Shibaura, in Tokyo Bay. A squall struck the aviator when about 300 feet high, and his machine was badly smashed, the right plane having buckled and the propeller broken. Fortunately the aviator was rescued by the water police within a few minutes of the accident and had no more serious injuries than a few bruises and a cold bath. Mr. Tsuzuki will repair his machine and make another attempt to fly across the bay.

I enclose several photos of Mr. Kouzminsky's meetings, which I hope will be interesting, and I trust some of them will be reproduced in your widely read magazine.

Availing of this opportunity to wish you a very happy and prosperous New Year and the AIRCRAFT every success it deserves, I remain,

Very truly yours,
A. F. B. SILVA-NETTO.

Hong Kong, Dec. 20th, 1912.

Austria

Through Louis Paulhan, the Curtiss Aeroplane Company has recently sold to the Government of Austria one of the latest models of the Curtiss flying boat. Shipment was made the latter part of January, and the official trials and delivery of the machine have been made.

During the past month Austria has ordered more than 100 new aeroplanes and a Zeppelin airship. As the Zeppelin Company, owing to an agreement with the German Government, cannot sell any of its airships to a foreign nation without German consent, the fact that Austria has been allowed to purchase one shows that these two countries are working very closely together in war projects.

Brazil

David H. McCulloch, of Newport, Pa., who has undertaken to introduce and demonstrate the Curtiss flying motor boat in South America, recently ordered a machine shipped to Brazil. While the machine is being shipped direct to Mr. McCulloch, it is understood that it is to be turned over to the Brazilian Government and will be used at the Government Aviation School recently installed near Rio Janeiro. This is the first of a total of five machines which the Brazilian Government expects to use at the school.

British West Indies

Frank E. Boland, an American aviator and inventor of a tailless and rudderless biplane, was killed when his machine dove while he was flying at Port of Spain, Trinidad, on January 24th. The cause of the accident was probably due to the large lifting front rudder jamming, or more likely breaking, and causing the machine to plunge head first to the ground.

While the death of Boland came as a great shock to many, it was by no means a surprise to those who had seen the machine, for, while the Boland biplane was undoubtedly good in principle, it was so poor in construction that many realized it was only a question of time before some vital part gave way, which seems to have happened in this particular case.

China

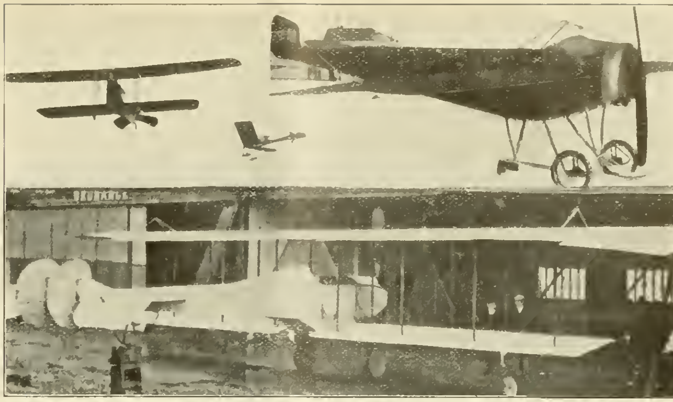
AIR FLEET FOR CHINA

The President of the Chinese Republic, on the suggestion of his French military adviser, Major Brissaud Desmailles, has decided upon the creation of an aerial fleet, the organization of which will be entrusted to French officers.

All Chinese staff officers, according to an announcement made recently, will be required to pass through the aviation school either as pilots or observers, and a series of competitions, to which all aeroplane constructors will be invited to send machines, will be held in Peking in 1914.

The Chinese Government, it is said, is anxious to have a great fleet of aeroplanes, which will be used for police work in time of peace.

The 50 H. P. Caudron biplane recently ordered by the Chinese military authorities has been tested by Rene Caudron at his grounds at Crotoy. The machine attained an altitude of 3,600 feet in 10 minutes, carrying a passenger and considerable extra weight. Twelve more Caudron biplanes have been ordered since.



NEW DEVELOPMENTS IN AEROPLANES ABROAD.

The top left-hand picture shows the new English Flanders tractor biplane in flight. The top right-hand picture shows a front and side view of a new Italian monoplane constructed by the Asteria company, which firm also builds the Breguet machines in Italy.

The small centre picture shows the latest Fokker inherently stable monoplane in flight, with the operator facing sideways and holding his hands extended above his head to demonstrate the machine's stability.

The lower picture shows the reconstructed English Coventry Ordnance tractor biplane, which has now been fitted with rigid planes in place of the warping wings hitherto used. On account of its tremendous surface and large power, this machine is capable of an enormous range of speed, it being able to fly at from 22 to 65 miles an hour, while its landing speed is only 18 miles per hour, which makes the biplane an uncommonly easy one to land.

Ceylon

Flights were made recently on the Colombo race course, Ceylon, by two French aviators, M. George Verminck and M. Marc Pourpe. Two machines were used, both being Blériot monoplanes.

England

REPORT OF THE MONOPLANE INVESTIGATION COMMITTEE

The committee appointed by the British War Office to inquire into the causes of recent monoplane accidents, by which several officers lost their lives, have arrived at these conclusions:

Accidents to monoplanes specially investigated were not due to causes dependent on class of machine to which they occurred, nor to conditions singular to monoplane as such. There is no reason to recommend prohibition of the use of monoplanes, provided certain precautions are taken.

Main wires and their attachments should be duplicated. Steps should be taken so that slight damage to an engine will not wreck the machine. Fabrics could be more securely fastened to the ribs and devices to prevent tears from spreading should be considered.

THE SECOND CODY FOR THE ARMY

On January 22nd the second 120 H. P. Cody biplane for the Royal Flying Corps passed its hour's test flight by flying for an hour and a half. It also passed its rolling test with ease. It is well to note that in the new type Codys the rudders are placed in the slip-stream of the propeller, so that the machines manoeuver very handily on the ground; in fact, they will turn under their own power in a circle of less radius than the span of the machine. In the latest machine there is a decided dihedral angle, so that there is a noticeable amount of natural lateral stability, and though perhaps the lifting power is slightly decreased, there is still an ample amount for any load which is likely to be put up. The elevators are now placed nine inches higher than in the Military Competition winner, which, Mr. Cody states, gives much better longitudinal balance, so that the machine will fly herself in anything like a steady wind.

ENGLAND TO SHOOT AT FOREIGN AIRCRAFT

England having become thoroughly alarmed over the frequent night visits of German airships to their shores, and not knowing what maps and photographs of their fortifications might have been taken from above for future German use, and without English consent, are pushing a bill through Parliament to prohibit aircraft flying over certain prescribed British districts under penalty of being shot at from below. Do not laugh, please.

France

TWO FRENCH SPORTSMEN PURCHASE HYDRO-AEROPLANE

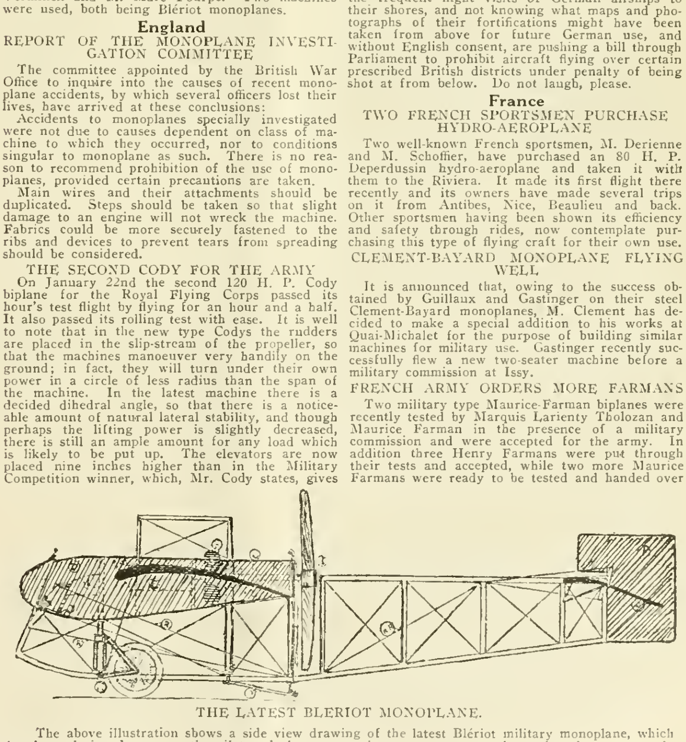
Two well-known French sportsmen, M. Derienne and M. Schoffier, have purchased an 80 H. P. Deperdussin hydro-aeroplane and taken it with them to the Riviera. It made its first flight there recently and its owners have made several trips on it from Antibes, Nice, Beaulieu and back. Other sportsmen having been shown its efficiency and safety through rides, now contemplate purchasing this type of flying craft for their own use.

CLEMENT-BAYARD MONOPLANE FLYING WELL

It is announced that, owing to the success obtained by Guillaux and Gastinger on their steel Clement-Bayard monoplanes, M. Clement has decided to make a special addition to his works at Quai-Michalet for the purpose of building similar machines for military use. Gastinger recently successfully flew a new two-seater machine before a military commission at Issy.

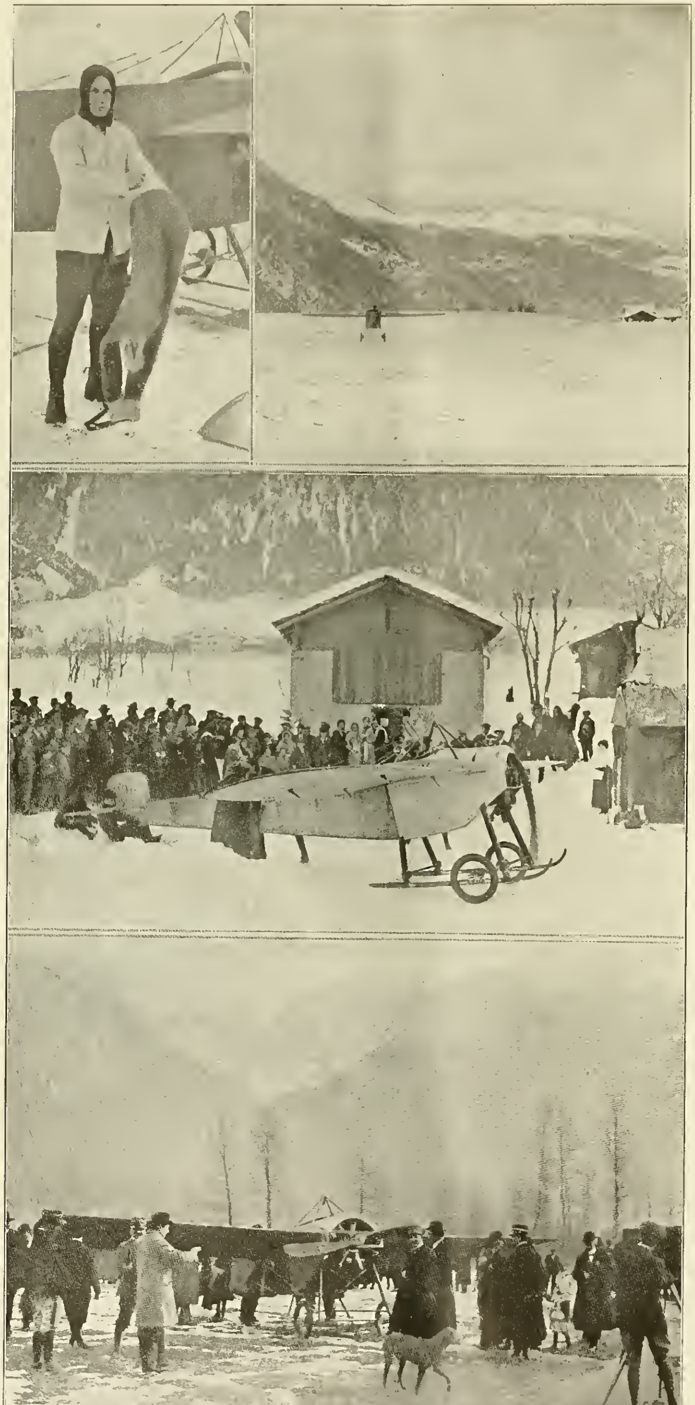
FRENCH ARMY ORDERS MORE FARMANS

Two military type Maurice-Farman biplanes were recently tested by Marquis Larienty Tholozan and Maurice Farman in the presence of a military commission and were accepted for the army. In addition three Henry Farmans were put through their tests and accepted, while two more Maurice Farmans were ready to be tested and handed over



THE LATEST BLERIOT MONOPLANE.

The above illustration shows a side view drawing of the latest Blériot military monoplane, which has been designed to carry the pilot and observer at the extreme nose, where they have an unobstructed view of the ground below them. Note the position of the propeller and motor.



Bielovuccic and his trans-Alpine flight.

to the Government. In addition Fourney tested a machine built specially for the Italian army with a load of 400 kilogs. It rose to 300 metres and flew for over an hour and a half.

CURTISS FLYING BOATS SUCCESSFUL IN FRANCE

With what enthusiasm Europe is taking up the flying boat as a sporting proposition is shown indirectly by the recent announcement of the Paulhan-Curtiss Company of France that they will open a new training school on the Seine near Paris immediately. The Paulhan-Curtiss hydro-aeroplane school at Jaun-les-Prus, on the Mediterranean, has proven very popular and given excellent results. The new school is located at Bezons and is expected to be in full working order this month.

CHARLES NIEUPORT AND MECHANIC KILLED

On January 24th, while flying at Etampes, Charles Nieuport and his mechanic were killed when, in making a quick turn, their monoplane side-slipped at a considerable height and plunged to the ground. The monoplane did not collapse, as was reported in almost all other American publications.

LICENSES FOR HYDRO-AEROPLANE PILOTS

At a recent meeting of the Federation Aeronautique Internationale at Paris it was decided to issue special licenses to hydro-aeroplane operators. The conditions are practically the same as for the ordinary licenses except that the tests have to be made over water.

CLOSED CIRCUIT FOR GORDON BENNETT RACE

Despite the provisional decision of a previous meeting and the recommendation of a sub-committee in favor of an open course, the F. A. I. decided at their recent meeting that the course for the next race for the Gordon Bennett trophy at Rheims shall be over a closed circuit of a distance of five kilometres (3.1 miles), which is the same as last year. The total distance will be 200 kilometres and the race will probably be held in July.

NOVICE AVIATOR FLIES FROM PAU TO MADRID, CROSSING THE PYRENEES

Oscar Bider, the Swiss pilot, who only recently learned to fly at the Bleriot School at Pau, decided that as a fitting finish to his tuition he would fly from Pau to Madrid in one day. Accordingly, on January 24th, he mounted his Bleriot at the aerodrome at Pau and at 7:19 A. M. was officially started. After climbing to a good height he steered for Arudy and followed the Ossau Valley past Laurens and the peak of Midi d'Ossau, which is over 9,000 feet high. He then steered along the railway past Jaca, Huesca, Sarragosa and then Ebre Valley to Catalayna. After nearly five hours of hard flying and finding his gasoline supply getting low Bider decided to land at Guadalajara, which is about 50 kilometres from Madrid. He was there welcomed by Colonel Yives Y. Vichy, who has done so much to further aviation in Spain. After resting for half an hour he set out for Madrid and landed at the Madrid aerodrome at 1:30 P. M.

LEGAGNEUX ESTABLISHES NEW FRENCH HEIGHT RECORD WITH A PASSENGER

In January Legagneux, with Miss Trehawke Davies as passenger in his 80 H. P. Morane monoplane, started from Issy on an attempt to break the height record. After climbing for one hour and three-quarters the machine had reached a height of 12,093 feet, which constitutes a new French height record, although it falls 700 metres short of the world's height record made by Lieut. Blaschke in Austria.

MICHELIN INTERNATIONAL CUP

The rules for the 1913 Michelin prize state that the prize will be given to the aviator who covers in a closed cross-country circuit before January 1, 1914, the greatest distance, provided it exceeds 2,000 kilometres. Last year the prize was not awarded, so the cash prize is added to this year's amount, and, being an international event, Americans will be able to try for it. The amount of the prize as it now stands is $8,0[illegible] in cash in addition to the trophy valued at $2,000.

The French military aviation department has been secretly testing the Moreau automatic stability machine and recently the French Minister of War sent a delegate to witness and report on the tests. In the presence of this delegate Moreau with a passenger flew the machine in a strong wind with his arms folded throughout the flight, the landing even being accomplished without touching the levers by simply throttling the motor and allowing the machine to glide until it almost touched the ground, when by simply accelerating the engine a bit the machine was levelled off and a perfect landing accomplished.

Germany

A MINISTER OF AERONAUTICAL AFFAIRS

It is proposed in Germany to create a minister of aeronautical affairs. Under the direction of the Minister of the Interior the new office shall be held by an aeronautical expert, who shall look after and have charge of air traffic. The idea of having an aeronautical minister is a good one, and in all probability within a few years it will be just as necessary for the leading countries to have their aeronautical ministers as at present they need their war ministers.

EMPEROR WILLIAM HONORS MILITARY AVIATORS

On his fifty-fourth birthday, which he celebrated recently, the German Emperor announced that he had created a special decoration to be worn by all military aviators while on flying service. The decoration consists of a silver medal in the centre of which is an aeroplane surrounded by a laurel wreath.

The German Government has bought the patent rights of the Schutte-Lanz airship and now contemplate acquiring several of this type of dirigible for both the army and navy. The Government also plans to acquire 15 more Zeppelins as fast as they can be turned out, and has just given a specific order for three Zeppelins to be built immediately. Germany will probably spend from $10,000,000 to $15,000,000 this year on further aeronautical development.

GERMAN PROGRAMME FOR 1913

The German Government are about to lay down at the Reichstag a project for the opening of a credit in 1913 of from $4,000,000 to $5,000,000 for the purpose of organizing the new aerial fleet. This programme will necessitate an annual expenditure of about $5,000,000, and it is suggested that this shall extend over a period of five or six years. Dirigibles of the Zeppelin type are, naturally, those most in favor at the present time, and provision will be made for the housing of a great number of them in various parts of the country, and the following is a list of those already decided upon: Two stations will face the North Sea—one at Emden, and the other by the Danish frontier, near the Island of Sylt. Three more stations will be situated on the Baltic—two at Kiel and one at Butsig. One already exists at Koenigsberg. No fewer than five will be placed on the French frontier—at Strassburg, Mainz, Metz, Carlsruhe, and Cologne. Two more will be situated at Frankfort and Dusseldorf, while on the Russian frontier two will be built at Thorn and Breslau. Each of these eleven centres will be equipped with laboratories and the means for producing hydrogen. That already existing at Potsdam will be enlarged and converted into an enormous structure for building dirigibles.

NEW GERMAN PRODUCTIONS

At Johannisthal, eight military officers have been sent to the Albatros works for tuition in piloting, while another eight have been sent to the Rumpler works. These two firms now seem to be busily engaged. Hirth, the chief pilot of the first named company, last month put the first of the 100-H.P. Mercedes-engined monoplanes through its tests. Rumpler has recently produced a new type of military monoplane also fitted with a 100-H.P. Mercedes engine, and another 80-H.P. "Pigeon."

E. Jeannin has recently produced a new steel monoplane fitted with 150-H.P. 6-cylinder Stoewer, and it is, in consequence, of a very fast description. It is of the usual German type, *i.e.*, has wings of the Etrich pattern, and also has a totally enclosed fuselage. Beneath this the radiator is placed. The pilot is situated behind the passenger, and windows are cut in the wings for observation. The whole framework is composed of oval steel tube.

Another new type made for the Army is by the German Wright Company, who have evolved a 5-seater biplane, driven by a 100-H.P. Argus. This has a small fuselage, and the two propellers are driven by a single chain.

GERMAN MOTOR COMPETITION

The awards given in the German Aero-Engine Competition were announced on January 27. The Emperor's prize of $12,500 has been awarded to the Benz Company, of Mannheim. The Chancellor's prize of $7,500 and the Minister of Marine's prize of $2,500 both go to the Daimler works, in Stuttgart. The War Minister's prize of $6,250 goes to the N. A. G.

The Emperor has now ordered a second competition to be organized, the funds for the prizes in which will be taken from the proceeds of the national aviation subscription.

AVIATION AT JOHANNISTHAL

The month of December last at this aerodrome provided a total of 23 flying days, the air being comparatively calm. On three days the wind velocity amounted to 33 m.p.h. In all 1,134 ascents were made by 61 pilots, of which that experienced pilot, Hartmann, made 79, his total duration being 11h. 4m. During the whole year 317 flying days occurred. 17,051 ascents being made, totalling 1,996 hours. The total number of pilot-certificates gained for the year has been 98, 10 of them having been obtained in December.

Greece

A special dispatch from the Island of Lemos, in the Aegian Sea, says the Greek aviator, Mutuasis, accompanied by Captain Maraitmis, on the night of February 6th, made a daring flight over the Straits of the Dardanelles in a hydro-aeroplane, traveling 180 kilometres. The dispatch says a thorough reconnoissance of the Turkish fleet was made. The aviator then flew over Maidos, near the southern point of the Gallipoli Peninsula, overlooking the Dardanelles, and dropped four bombs on the arsenal there. The aviator reported that as he passed over the fleet he saw flashes from the vessels' guns as they fired at him. The hydro-aeroplane was not hit. Captain Maraitmis says he was able to make observations during the flight that were far more valuable than he had expected.

It is admitted by the majority of Greek generals now in the field that the aeroplane has not only become a great factor in modern warfare, but that many battles have been easily won by the Greek forces against Turkey owing to accurate information furnished by Greek aviators as to the position and strength of the Turkish forces, that might not have been won at all, or else won only after a great sacrifice of life and ammunition.

Italy

On January 23rd, at Vizzola Ticino, Aviator Slavorossof broke the world's speed record for 200 and 250 kilometres with a passenger. Piloting a 80 H. P. Caproni monoplane round a 5 kilometre circuit, he covered 200 kilometres in 1 hr. 56 min. 30 secs., and the 250 kilometres in 2 hrs. 24 min. 30 secs.

At the same time Aviator Borgotti, on a 100 H. P. Caproni, rose to a height of 3,000 feet in 6 minutes with a passenger.

Four Curtiss hydro-aeroplanes, already officially tested and accepted, form the nucleus of the Italian Naval Flying School at Venice. Other machines will be added later. The Curtiss machines were sold to the Italian Government by Paulhan.

Morocco

Half a dozen Deperdussin monoplanes, two 2-seaters and four single seaters have been sent to the French military station at Oudjda, and Lieuts. Majnien, Jannerod, Bruncher and Soulsialand have been appointed to pilot them.

Russia

RUSSIA'S GENEROUS ORDERS

The latest order from the Russian Government is to Farman's for no fewer than 100 of their biplanes. An additional 16 of the new type Henry Farman, equipped with machine-guns, have been ordered. Of the former, 70 will be manufactured in Moscow and 30 in St. Petersburg. Previous to this order, one for 37 German Wrights had been given.

Spain

Considerable flying is being accomplished at the aerodrome of the Four Winds at Madrid by the military aviators stationed there, and much interest is being taken in the tests of the new Bristol machines which are being demonstrated.

Switzerland

BIELOVUCCIC FLIES ACROSS THE ALPS

Jean Bielovuccic, the Peruvian aviator, flew right across the Swiss Alps from Brig, in the canton of Valais, to Domodossola, Italy, in less than half an hour on January 25th. He ascended at Brig in his Hanriot monoplane exactly on the stroke of noon and landed at Domodossola at twenty-five minutes past twelve.

Bielovuccic had been waiting for favorable weather in which to undertake his daring feat since January 9th. He followed exactly the same course over the Simplon Pass as was taken by his late friend and compatriot, George Chavez, in September, 1910. Chavez accomplished the flight from Brig to Domodossola on that date, but in landing was hurt severely and later died from his injuries.

Bielovuccic had made one previous attempt to cross the Alps on January 14th, but after ascending six thousand feet on that day was forced to make a hurried landing, owing to a defect in the motor of his monoplane.

SWISS AEROPLANE SERVICE

Three Swiss pilots, Taddeoli, Granjean and Durafour, intend to start a service of aeroplanes in the Spring between Geneva, Evian and Lausanne.

CONVERTING A REAR PROPELLER BIPLANE INTO A TRACTOR

WITH

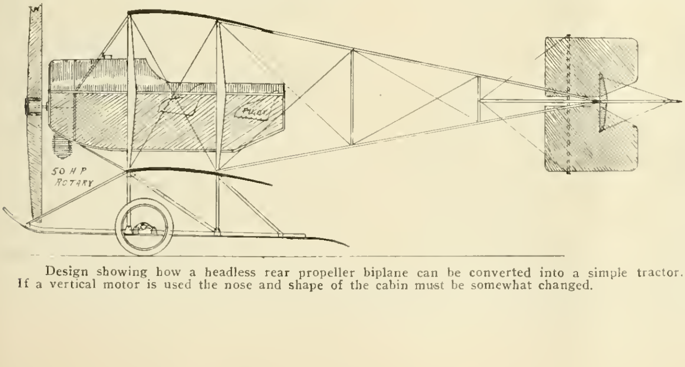
A Suggested Design for a Simple Biplane, Together With Notes on its Design and Construction

By WALTER H. PHIPPS

Since the establishment of AIRCRAFT, several years ago, it has been its aim to not only act as a reflector of aeronautical doings in all parts of the world and thereby compile a contemporary history of the movement, but likewise to be of general service to its readers by pointing out new methods and offering criticisms on the different types and makes of aeroplanes in order that further errors might be avoided and improvements result therefrom.

In so many different instances have AIRCRAFT'S suggestions been utilized with good effect and its predictions been verified by actual happenings that the entire movement has come to look upon this magazine as a sort of bureau of aeronautical information, so that those desiring new and first-hand information turn to its columns for their data.

It is in pursuance of this policy of offering suggestions and in response to many of our readers' inquiries regarding the design for a simple tractor biplane that the machine illustrated in the accompanying drawings was designed. As has been repeatedly pointed out in these columns, the tractor or engine in front aeroplane has many advantages over the rear engine type, both for safety, comfort and speed (see articles in the May issue, page 85, Vol. 3, and the November issue, page 274, Vol. 3), and in view of these facts it is no wonder that several of our leading aeroplane manufacturers are now turning out machines of the engine in front type to better meet this year's Government specifications for military aeroplanes.



Design showing how a headless rear propeller biplane can be converted into a simple tractor. If a vertical motor is used the nose and shape of the cabin must be somewhat changed.

While the new Burgess and Curtiss military tractor biplanes (the new Wright is also a tractor, but no details are at hand as to its design) are necessarily of large size, they do not differ greatly in general form of main planes and tail from the standard rear propeller biplanes of these makes, and this proves conclusively that rear propeller biplanes can be successfully converted into tractor machines, provided the distribution of weight on the main planes and tail is not altered. In other words, a large number of successful tractor biplanes are simply correctly balanced aeroplanes in which man and motor have changed places and been properly balanced about the centre of pressure.

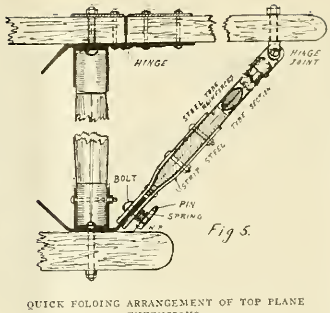
One of the best instances of what can be done in the way of converting a standard rear propeller type biplane into a successful tractor, is shown in the new Sopwith machine, which is practically a standard Wright biplane, with standard main planes and tail in which the weight of motor and man has been so distributed in the fuselage that the flying balance of the whole is not affected. By this it must not be thought that any machine can be converted into a tractor by simply building a fuselage and then changing the places of the man and motor in it without taking into consideration the weight of the fuselage, which is more than likely to throw the balance of the whole machine out. In other words, care and thought must be used in redesigning a rear propeller biplane into a tractor to see that the weight distribution and load carried by the main planes and tail shall be analogous to that carried by the

original machine, unless, of course, it is intended to carry a little extra weight on the main planes or tail, in which case provision will have to be made for this by increasing the area and lift in proportion to the additional weight to be lifted.

The following are interesting instances of machines which have flown both as tractors and rear propeller types. The Caudron biplane has been flown as a hydro with the engine in the rear, while as a land machine it uses the engine and propeller in front; Curtiss, in his experiments with hydroaeroplanes, operated his standard type machine both as a rear propeller and tractor type with good success; the Sommer biplane has also been flown both with a tractor and rear propeller drive, while the Benoist biplanes, employing practically the same main planes and tails have been operated equally as successfully whether the motor was placed in the front or rear, the balance of the machines in each case being correctly worked out to suit the changes in the distribution of the motors.

From the foregoing it will be seen that standard biplanes can, if properly redesigned, be operated either as tractors or rear propeller types, and the question arises as to which is the best way to convert a rear propeller type into a tractor.

For large touring and military machines it is undoubtedly advisable when designing a tractor to use a long fuselage body carrying the tail at the rear. This, however, makes the land transportation of such a machine somewhat difficult, as a fuselage cannot very well be taken apart, and even if a jointed fuselage is used it does not make shipping very much easier, as it still leaves the fuselage in two big bulky sections. In addition, in converting a rear propeller biplane into a tractor, if a long fuselage is used it necessitates throwing away all the rear outriggers and perhaps redesigning or at least reconstructing the tail so as to attach it properly to the fuselage.



QUICK FOLDING ARRANGEMENT OF TOP PLANE EXTENSIONS.

A method, however, can be arrived at which will allow of the outriggers and tail being left as they stand and the machine converted into a tractor by building a small cabin to carry the motor in front and the operator or operators in the rear. This cabin arrangement has already been successfully used on the Caudron biplanes and found to give entire satisfaction, as it presents all the safety and comfort advantages of the long fuselage without its disadvantages of bulk and weight and shipping drawbacks. Of course, in fitting a machine with one of these front motor cabins it is necessary to arrange the weight distribution in such a manner that the motor and man are properly balanced about the centre of pressure. However, should the builder miscalculate a bit in building the cabin, the aeroplane can be easily balanced by moving the whole cabin either backward or forward according to whether the machine is nose heavy or tail heavy; if the former, the cabin is moved back, while in the latter case all that would be necessary would be to move it slightly forward.

This arrangement of balancing the machine is much simpler than the method employed in balancing ordinary rear propeller machines, for with this type it is usually either necessary to unbolt the engine and move it backward or forward on the engine beams or unfasten the seat and shift it either forward or back. It is this striving for a good balance that has made it necessary on some machines to put the operator way out in the front of the main planes in an exceedingly dangerous and exposed position, and this arrangement should not be tolerated for a minute except in the cases of military scouting machines where it is absolutely necessary that the observer should have the clearest possible view.

The accompanying drawings, although showing an improved biplane specially designed with a view to increased efficiency, safety, comfort, simplicity of construction and ease of transportation, illustrate likewise the manner in which almost any type of rear propeller headless biplane can be neatly and easily converted into a front engine and tractor driven machine.

One of the objects of the accompanying design is to illustrate improvements in general biplane construction. As will be noticed, the top plane is of considerably larger span than the lower one, which arrangement permits of the fitting of ailerons at the extreme tips of the wings in such a position that they exert the utmost leverage and quickest control. To further increase the lateral control the top plane has a greater span across the rear than in the front, so that the ends of the ailerons work in practically undisturbed air and at a point where they exert the greatest possible leverage.

A further advantage of the large overhanging top plane is that it increases efficiency and gliding ability since a large portion of the top plane is unshrouded by the lower plane and is acting practically as a monoplane surface.

Still another advantage of the top extension planes is that they can be folded down to accommodate storage of the machine in small barns or sheds, and in addition, if it is necessary to leave the machine in the open, its lifting surface can be greatly cut down by folding down the extensions and thus make the machine capable of weathering a storm which otherwise might lift the whole machine up and destroy it. By the aid of the special fittings shown in fig. 5, the top extensions may be folded down in a few seconds by simply removing the steel pin and spring and then pulling out the smooth bolt. This can be better understood from a study of the drawing.

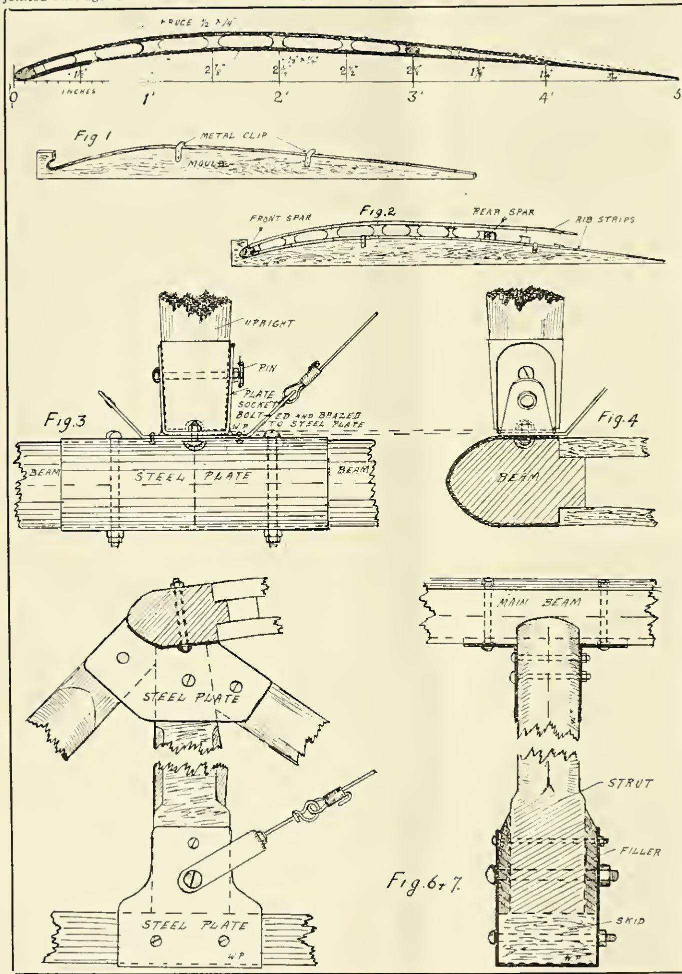
The same method of increasing the efficiency of the controls has been applied in the rear elevator, which is broadest at its rear edge and for the same reason as outlined in the ailerons, gives tremendous control.

As will be noticed, the centre of weight is placed fairly high up, thus bringing the centre of thrust and centre of resistance practically coincident with the centre of lift, which makes for ease of control, good gliding ability and the utmost efficiency.

In addition, the placing of the cabin in this position allows of a low landing gear and consequently great strength and safety. The skids, which are of generous length, protrude well forward and protect the propeller and prevent capsizing, while their rear extremities are shod with steel snag springs, which absorb the weight of the tail and also act as brakes, for in landing the elevator flap can be held up and the weight and pressure of the tail applied as a dragging force on these springs. In starting, however, they do not impede the machine's progress over the ground, as the tail is held up in the air.

The accompanying drawings show a diagramatic side view of a two-passenger biplane of the same type, and also illustrate the suggested rib curve, which is a modification of the Caudron type, having a one-foot flexible extension instead of the three-foot extension of the Caudron rib. which is effected by atmospheric changes and consequently likely to warp out of shape and is hence unreliable unless carefully watched.

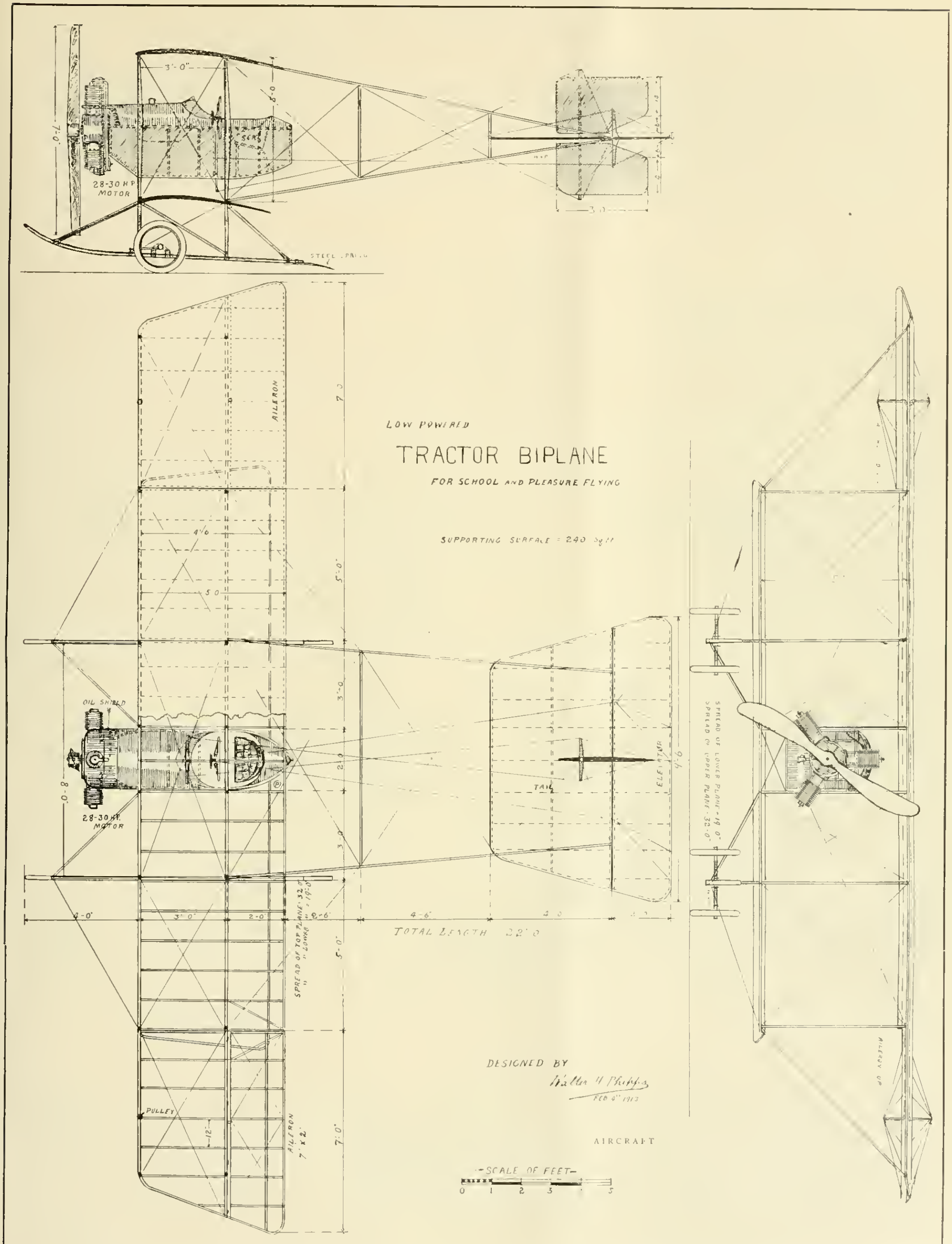
Figs. 1 and 2 show a method for building ribs. Fig. 1 illustrates the solid wooden mould which is sawed out to the correct shape of the under side of the rib curve and has a notch cut at the front to accommodate the front main beam of the wings. Fig. 2 shows how the rib is built up on this mould, the spacer blocks being first attached to the lower rib batten with brads and glue and then laid in the mould and the top batten nailed and glued in place as shown. Other drawings show construction details of the various parts of the machine.



SOME CONSTRUCTION DETAILS.

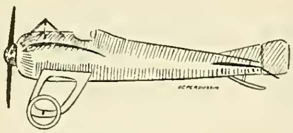
The top diagram shows the rib section of the suggested tractor. Figs. 1 and 2 the method of building the ribs on a mould. Figs. 3 and 4 show a combination strut socket and main beam clamp. Figs. 6 and 7 illustrate two skid joints.

SUGGESTED DESIGN FOR A SIMPLE TRACTOR BIPLANE

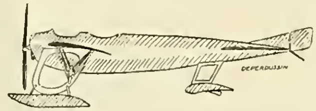


Side, Plan and Front View Drawings for a Small Enclosed Cabin Tractor Biplane

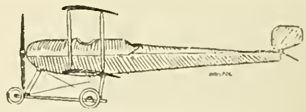
MACHINES EXHIBITED AT THE FOURTH ENGLISH AERO SHOW



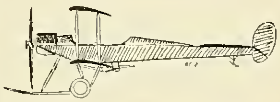
The 50-h.p. Deperdussin *monocoque*



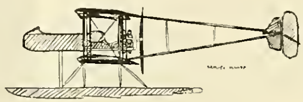
The 100-h.p. Anzani-Deperdussin hydro-monoplane.



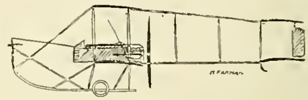
The 70-h.p. Renault-Bristol biplane.



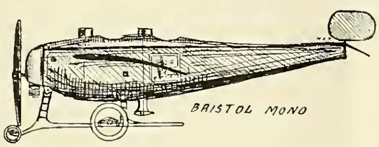
The "B E 2" British Army biplane.

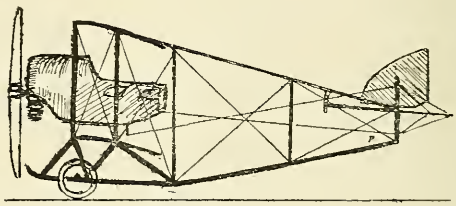


The 160-h.p. Samuel White hydro-biplane.

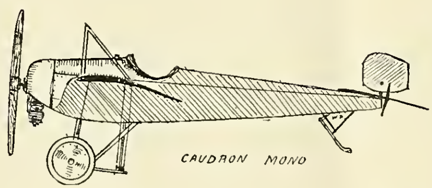


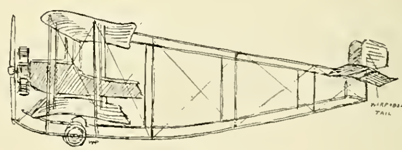
The 70-h.p. Maurice Farman biplane.



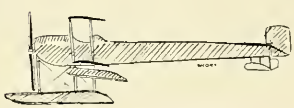


LATEST CAUDRON BIPLANE

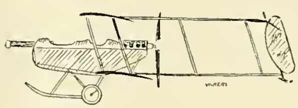




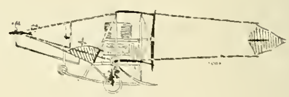
30 H.P. CAUDRON BIPLANE



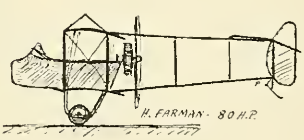
The 80-h.p. Short hydro-biplane.

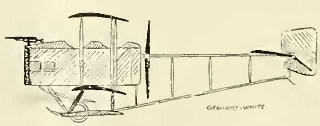


The 60-80-h.p. Wolseley-engined Vickers biplane.

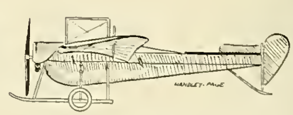


The 120-h.p. Cody biplane.





The 90-h.p. Grahame-White military biplane.



The 50-h.p. Handley Page monoplane.

AIRCRAFT

Diagramatic side view drawings of the most important of the exhibits.—Special attention is called to the English built Deperdussin hydro-monoplane, which has the wings braced by a steel tube framework; the 160 H. P. Samuel White hydro-biplane, with its long floats and backwardly sweeping wings, and also the new 90 H. P. military Grahame White biplane, which has the engine in front and the propeller in the rear, as advocated in AIRCRAFT.

THE FOURTH ENGLISH AERO SHOW

The fourth English Aero Show, which was held at Olympia February 14th-22nd, showed in a marked degree the progress made by the English aeroplane constructors during the last twelve months and proved that for design and construction English machines now rank with those of France and Germany and in some cases they even excel.

One of the features of the show was the exhibiting by the English Government of two army biplanes and a dirigible, which shows that the English War Department is taking an official interest in aviation and from now on intends to co-operate more with the various builders and designers, instead of leaving nearly everything to the Royal Aircraft Factory.

Whereas last year it was noticeable that there were no hydro-aeroplanes exhibited, this year we find an astonishing increase in this line, as practically all of the well-known constructors have turned their attention to the marine aeroplane and have constructed one or more of this type of craft. Thus we find the Short Brothers Company, W. H. Ewen, Sopwith Aviation Company, Samuel White Company, Aeros Limited, Avro Company and others either showing complete hydro-aeroplanes or machines capable of being easily converted into this type.

Amongst the most interesting of the exhibits are the new Samuel White hydro-aeroplane, which has been designed by the well-known English designer, Howard T. Wright. It is a large biplane of 160 H. P., something on Farman lines, but having a new plane section and backwardly sweeping wings. The floats, which are of the three-step type, are very long and have two water rudders attached at their rears to facilitate steering on the water. The Sopwith Aviation Company showed two new machines, one a novel type flying boat, having both front and rear elevators (see scale drawings, April, 1913, AIRCRAFT), the other a tractor biplane with Wright type wings. The Grahame-White Company exhibited a 90 H. P. military biplane having the engine in front, with operators in back. The single rear propeller is driven through shaft and chain transmission in a similar manner to that suggested in the November, 1912, AIRCRAFT, page 275. In addition there was shown a new type Grahame-White biplane fitted with only a 35 H. P. motor.

NEWS IN GENERAL

By D. E. BALL

Burgess Notes

The Burgess Coast Defence Hydro-aeroplane passed its trials on January 18 and 20, and the school was formally closed at Marblehead on the latter date for the winter. Flying will continue under the direction of Frank T. Coffyn at Palm Beach until about the first of April.

The Government has sent the Burgess Coast Defence Hydro to Palm Beach, where Lieutenant Loren H. Call, of the G. A. C., is flying the machine, and Lieutenant Eric L. Ellington is continuing his training under Mr. Coffyn.

Mr. Carruthers, of Montreal, will take a course in flying, and a number of others are making arrangements.

Construction work on the new flying boat is well under way, and it is expected that the machine will be ready for trials long before weather will permit their being made in Marblehead.

A new type of hydro-aeroplane is also in the designing room, which will meet more nearly the requirements of the average sportsman. Another announcement concerning this machine will be made later.

Lieutenant Murray, of the U. S. Navy, has been assigned to inspection service at Marblehead, where he will become familiar with construction work.

Mr. F. H. Russell, manager of the company, spent a week recently in Augusta, Ga., in connection with the flying of the Signal Corps at the winter station. The Burgess Tractor is now being actively flown there by Lieutenant Milling.

Burgess Coast Defence Hydro-Aeroplane

This machine was designed by W. Starling Burgess in the fall of 1912 to meet the special requirements of the U. S. A. Signal Corps in connection with their coast defence service.

An aeroplane was desired having the operator and observer so located in the machine as to be able to command the greatest possible range of observation.

The new Sturtevant six-cylinder, 60-70 H. P. motor was selected as the power plant for this machine.

Plans were completed early in November, and by the latter part of December the hydro-aeroplane was well on toward completion in the shops. Noticeable features in its construction are given below:

Spread of wing, 40 feet. Depth, 6 feet 3 inches, having a new camber design with a special view for speed and weight carrying. The wing sections are constructed as units and are fastened together by special interlocking hinges.

The ribs are of an essentially new American design, having a solid center member of a new wood making an eye beam with spruce strips top and bottom. These ribs are hinged to the front spar or girder, thus making warping easy and without strain to the girder, as in the old Wright system, where the girder itself is twisted. Wing girders are hollow, and in the case of the rear girder, with a solid section running through the center.

The covering used is an Irish linen especially prepared by the Burgess Company, similar in a general way to the fabrics now accepted as standard in French service.

The power is delivered through extra heavy chain guides and shafts mounted on Italian ball bearings to two propellers, especially designed by Mr. G. B. Curtis. Shaft ratio, 13-36.

The fuselage is entirely enclosed, covered with cloth fore and aft, and with aluminum around the section enclosing the engine. The operator and observer seats are located in tandem well forward of the front planes, with plenty of room for the installation of scientific instruments and writing pad. It is found that the heat from the motor travels forward sufficiently in the fuselage to make riding even in cold weather very pleasant indeed.

The horizontal and vertical rudders are very similar to those which have given such perfect satisfaction in the Burgess 1912 tractor built for the Signal Corps.

The machine is now equipped with Wright controls.

The hydroplanes are of novel design, especially made with a view of rising easily and alighting with a heavy load. They are constructed with mahogany sides and copper bottoms and tops. One step located amidships, concave in form, running back at a distinct angle upwards towards the stern to a flat bottom. This type is especially designed by Mr. Burgess, and will be protected by letters patent.

The machine made its first flight in Marblehead harbor on January first with Mr. Russell as passenger. It was found that it controlled very nicely, and only the weather prevented further trials until January 6, when Mr. Burgess made three or four straightaway flights. On the 17th the first long flight, including turns and figure eights, was made by Mr. Burgess, who then turned the machine over to the chief aviator, Mr. Frank T. Coffyn, who made two flights with it the same day.

On the 18th the Board of Officers for the Government was notified that the machine was ready for its official trials, and the endurance flight was immediately commenced. This was accomplished successfully in a flight of two hours and six minutes carrying the following weights:

	Pounds.
Gasoline	120
Hydroplanes	310
Aviator	175
Passenger	160
Instruments and miscellaneous	10
Total	775

The speed test was also taken over a course twice with and twice against the wind, showing an average speed of 59.2 miles per hour with the above-mentioned load.

On the completion of this flight Mr. Coffyn put the machine up for the day on account of the cold, and on Monday, the 20th, completed the Government tests by carrying 50 pounds overweight in the altitude test, which was successfully performed the first time at an average climbing rate of 210 feet per minute. (The requirement was 150 feet per minute.) Immediately after the completion of the flying the Board assembled and accepted the machine on behalf of the Government.

It is worthy to note that Mr. W. Starling Burgess in the year 1912 designed two distinct types of aeroplanes to meet the Signal Corps requirements on which a number of firms secured orders. The Burgess Tractor went into its tests and completed them successfully in six days last August. The Burgess Coast Defence Hydro-aeroplane above described completed its Government tests in two days.

The Burgess military tractor was never altered in a single detail from Mr. Burgess' original drawings. They met with the same remarkable success in the hydro-aeroplane, there being but a slight increase in the vertical rudders after the first tests were made.

There has been a great deal of criticism both in this country and abroad as to the ability of American designers to construct successful types in keeping with the progress in design which is so apparent both in France and Germany. Mr. Burgess' work during 1912 goes very far to refute the justice of this criticism.

The new flying boat type hydro now being

SCENES AT THE ARMY AVIATION FIELD, AUGUSTA, GA.

The two top pictures show the Burgess tractor biplane in action, while the lower one shows the tent hangars with Wright, Curtiss and Burgess-Wright machines drawn up in front of them.

built for the Navy by the Burgess Company is the third distinct type of machine which has been created by Mr. Burgess during the last twelve months, and it is expected that it will meet the requirements of the Navy in the same efficient and successful manner that marked the acceptance of the Burgess Coast Defence Hydro-aeroplane.

Burgess Hydro-aeroplane with 6-cylinder Sturtevant:

	Lbs.		Galls.
Consumption per hour......	44.3	or	7.4
Consumption per mile......	.768	or	.128
Consumption in pounds per H. P. hour..............	.68		
Capacity of gasoline tank in miles	278		
Consumption of oil per hour	5.2	or	.73
Consumption of oil per mile	.09	or	.01265
Capacity of oil tank in miles	285		

Book Review

Wireless Telegraphy and Telephony Simply Explained by Alfred P. Morgan, 154 pages, profusely illustrated. The Norman W. Henley Publishing Company, Publishers.

This interesting little book embraces complete and detailed explanations of the Theory and Practice of Modern Radio Apparatus and its present day applications, including wireless installments on aeroplanes and airships. Another interesting feature of the book is the chapter on the future possibilities of wireless.

20,000 Kilometer im Luftmeer by Hellmuth Hirth. The work is printed in German and contains 237 pages and many illustrations, including a scale drawing of the latest Etrich-Rumpler monoplane. It is published by Gustav Braunbeck, Berlin, Germany.

The Dynamics of Mechanical Flight by Sir G. Greenhill. D. Van Nostrand, Publishers. The contents of this book treats in chapter I on the General Principles of Flight, Lift and Drift; Chapter II, Calculation of thrust and centre pressure of an aeroplane; Chapter III, Helmholtz-Kirchoff, Theory of a Discontinuous Stream Line; Chapter IV, Gyroscopic Action, and General Dynamical Principles; Chapter V, The Screw Propeller, and Chapter VI, Pneumatical Principles of an Air Ship.

The First American Passenger Sailing Airship Company, Inc., New York City. Capital, $20,000. Incorporators: Frank Weninger, 122 Schenectady avenue, Brooklyn, N. Y.; George A. Faller, 74 Schenectady avenue, Brooklyn, N. Y., and Tony Mundus, 495 Bainbridge street, Brooklyn, N. Y.

Jerome Fanciulli's New Company

Organized for the purpose of manufacturing military flying machines and marine aeroplanes for sportsmen, the "Aquaero" Manufacturing Company, of New London, Conn., capitalized at sixty thousand dollars, has applied for a charter, and expects to launch its first flying motor boat by the first of May. The plans of the new aeroplane company, as announced by its officers, provides for the application of the designing and construction methods employed by the successful automobile manufactories. They state that their company will be the first to employ a staff of engineers to design aircraft, and that while the machines which will be manufactured will have no radical changes from existing models, many innovations will be introduced in the construction of the machines and in their equipment.

Heading the new company as president and general manager is Jerome Fanciulli, well known as the manager of the Curtiss aeroplane business for three years. He has been prominently identified with the development of aviation in this country for six years, and last winter introduced the hydro-aeroplane in Europe.

Henry R. Bond, Jr., prominent in society and a liberal patron of all sports, has accepted the vice-presidency of the Aquaero Manufacturing Company. Mr. Bond is treasurer of the New London Ship and Engine Company, a subsidiary company of the Electric Boat Company, builders of the Holland submarines. The treasurer of the new aeroplane company is Edward C. Hammond, of Boston and New London, well known as a sportsman. His interest in the new company is actuated by a desire to see the aeroplane developed for over-water flying. P. Le Roy Harwood, a prominent banker of New London, is secretary.

"There has been general complaint of stagnation in the progress of aviation in this country," said Henry R. Bond, the company's vice-president, in discussing the matter. "Mr. Fanciulli, who has been most actively associated with the business development of this growing industry, proposed the organization of the Aquaero Manufacturing Company for the purpose of arousing the interest of sportsmen in the marine type of flying machine. Our company is unique in that it is not confined to the ideas of one inventor, but is, on the other hand, an organization of business men and enthusiasts adopting as its guide the broad business principles that are responsible for the prosperity of so many well organized automobile concerns.

"A number of the policies on which we have decided are at direct variance with those of the existing aeroplane companies. Among these may be mentioned the decision of the company to equip its "Aquaero" planes with the best available motor, thus keeping pace with the improvements that will be made in aviation motors from time to time. Machines for flying over the water will be the standard apparatus of the new company, and not the exception. Another policy we have determined upon is that of discouraging fancy exhibition flying, urging the substitution of competitive contests instead."

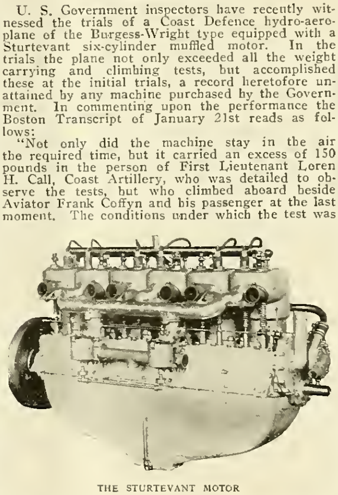
The company has acquired a factory on the Thames River, adjoining the grounds of Fort Trumbull. The president's office will be established in Washington, D. C., where all business will be transacted.

Mr. Fanciulli, the president, in discussing the company's plans, said: "We intend to inject new life in the aeroplane business. With increasing governmental appropriations for aeroplanes and with the pleasure possibilities of the marine flying machines, the aviation industry is facing a period of expansion and growth more promising on account of the permanent nature of this growth than have been the several years of lucrative aeroplane exhibitions. There has been lacking a company with an organization of technical experts —a company on a par with leading concerns in other lines of manufacture. We are entering into contracts with expert engineers to design our products; the demonstrating aviators which we will employ will be a credit to the company; the materials used in the construction of the machines will be thoroughly tested; and we will inaugurate a practice in the aviation business by applying the most up-to-date manufacturing and business methods in the management of our company."

Sturtevant Motor in First Coast Defence Hydro

U. S. Government inspectors have recently witnessed the trials of a Coast Defence hydro-aeroplane of the Burgess-Wright type equipped with a Sturtevant six-cylinder muffled motor. In the trials the plane not only exceeded all the weight carrying and climbing tests, but accomplished these at the initial trials, a record heretofore unattained by any machine purchased by the Government. In commenting upon the performance the Boston Transcript of January 21st reads as follows:

"Not only did the machine stay in the air the required time, but it carried an excess of 150 pounds in the person of First Lieutenant Loren H. Call, Coast Artillery, who was detailed to observe the tests, but who climbed aboard beside Aviator Frank Coffyn and his passenger at the last moment. The conditions under which the test was



THE STURTEVANT MOTOR

made could scarcely have been worse, as the wind, blowing from 12 to 15 miles an hour when the craft left the water in Marblehead harbor at two o'clock, increased to thirty miles by three o'clock, and the aviator and his two passengers remained in the air until six minutes past four.

"The climbing requirements were 1,500 feet in ten minutes, with the same load as in the duration test. Carrying an excess of fifty pounds this time, the new war craft reached the height demanded in a little more than seven minutes, rising at the rate of 210 feet per minute."

Great credit is due to the excellent performance of the Sturtevant motor, which enabled this plane to pass its trials so successfully, and when it is remembered that extra weight was carried and that the motor was equipped with a muffler and starting device, it will be seen that there was plenty of reserve power for extraordinary conditions.

Sturtevant muffled motors are rapidly being adopted by the U. S. Government for both land and water flying. It is easily realized that the muffled motor will become one of the most important factors in future aerial manoeuvers. The penetrating "bark" of the unmuffled aviation motor can be heard before the machine is sighted, and even when it is manoeuvering above the clouds. At 250 feet the Sturtevant muffled motor is absolutely noiseless. With this motor the aeroplane will become a silent and deadly arm of warfare which, like the submarine in naval engagements, can strike before being apprehended.

The accompanying photograph shows the type of motor used in the Coast Defence hydro-aeroplane mentioned above.

Requirements for Scout Type Military Aeroplane

General requirements:

1. Enclosed body.
2. Protective armor for aviators and engine. This armor shall be made of chromo steel and about .075 inches thick. The armor shall be subject to the Ordnance Department penetration test for small arm fire before being placed on any machine.
3. The following instruments and radio equipment shall be placed on each machine by the manufacturers and shall be considered a part thereof:
   1. Tachometer.
   2. Compass.
   3. Aneroid barometer.
   4. Barograph.
   5. Map holder.
   6. Pad and pencil holder.
   7. Clock.
   8. Angle of incidence indicator.

All of the above instruments shall be of the make and type approved and furnished by the Signal Corps, U. S. Army.

4. Provisions for a radio apparatus shall be made on each machine. This apparatus shall be furnished by the Signal Corps, drawings and specifications of which will be furnished to the manufacturer by the Signal Office. The base for the generator shall be part of the engine base. The generator will be driven by chain or gear from the engine unless a generator is selected which is mounted as part of the engine. The hanging antenna should be as nearly under the center of gravity as possible. This antenna shall be arranged to unwind readily from a reel and fixed so that it can be cut loose when desired with some foot mechanism. It is estimated that the weight of radio telegraphic apparatus will be about 75 pounds.

All of the above instruments and the keys for operating the radio apparatus shall be within easy reach of the pilot and observer.

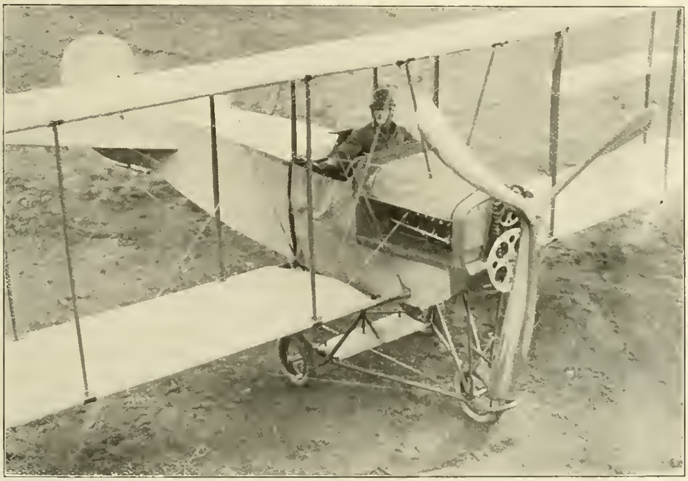
5. The power plant of each aeroplane may be designated by the Chief Signal Officer, U. S. Army. When so specified, it shall be given a six hours' test on the block to determine its H. P., speed and gasoline and oil consumption before being installed in the machine. The H. P. of the motor will be designated by the manufacturer, who will be responsible that the aeroplane fulfills the actual air tests when the motor is turning out the H. P. that he specifies. The Chief Signal Officer will be responsible for the reliability and H. P. of any power plant that it specifies or purchases for installation in aeroplanes.

6. Upon delivery for tests the manufacturer will furnish the following data concerning the aeroplane:
   (a) Weight.
   (b) Normal angle of incidence in horizontal flight.
   (c) Gliding angle.
   (d) Gasoline and oil consumption of engine.
   (e) Safe increase angle of incidence.
   (f) Two blueprints of engine and aeroplane.

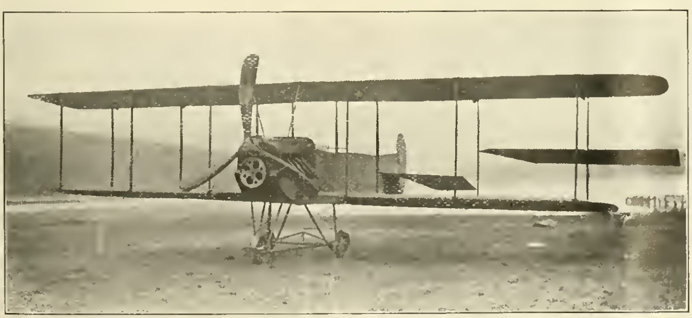
The following air tests shall be passed by each aeroplane before it is accepted by the Government:

1. The aeroplane must carry two people with seats located to permit the largest field of observation for both.
2. The control must be capable of being used by either pilot or observer.
3. The machine must be able to ascend at least 2,000 feet in ten minutes, while carrying a live load of 450 lbs., and fuel and oil for four hours' consumption. This live load will be made up of the operator and observer and such other weight as may be put in the enclosed body to make up the 450 lbs. The live load does not include the weight of the instruments and radio telegraphic equipment, which are part of the machine. This live load is to be carried in all the prescribed flying tests except the test in paragraph 10.
4. The machine must be capable of being transported by road, in which case its width must not exceed 10 feet. The construction must be such that it can be assembled for flight within one hour by six men.
5. The engine must be capable of being so throttled as to allow one person to make a flight without any other person assisting. This test to be made by the operator starting the engine and making a flight without any assistance.
6. The machine must complete a continuous flight for four hours, the first part of which shall be a non-stop, cross-county flight of at least 180 miles over a course designated by the Board conducting the tests. The flight may be completed over the aviation field.
7. The machine must have a minimum speed of not more than 38 miles per hour, and a maximum speed of not less than 55 miles an hour. The maximum and minimum speed must be measured by the machine flying over a course.
8. The machine must be capable of landing on and flying from harrowed ground and long grass within 100 yards.
9. The machine must be capable of safe gliding.
10. The efficiency and reliability of the system of control must be demonstrated as follows: The aeroplane must be capable of executing a figure eight within a rectangle of 500 yards by 250 yards, without decreasing its altitude more than 100 feet upon the completion of the figure eight. This test may be made by the aviator alone.
11. Manufacturers must provide a name plate for each machine, giving necessary data, such as maker's type and serial number. Painting of names or similar data on any part of the machine is prohibited.

Glenn H. Curtiss flying the new Curtiss military tractor biplane at San Diego, Cal. The planes of the machine are slightly swept back in a manner similar to the Lohner Arrow biplane.



Close view of the new Curtiss tractor, showing the position of the operators and motor. Note the chain drive transmission, three-bladed propeller and new landing chassis.



Front view of the new Curtiss tractor biplane. The main planes and tail are quickly dismantable and the whole machine can be knocked down in 30 minutes.

12. The manufacturers shall furnish the demonstrators for all tests.

13. The system of control must be of a pattern approved by the Board of Officers conducting the tests.

14. The suitability of each machine for military purposes shall be determined by a Board of Officer Aviators appointed by the proper authority, who shall conduct all tests.

15. The following desirable features will give the machine a higher rating under paragraph 14:

(a) An effective silencer with cut-out on the engine.

(b) An actual flight in a 20-mile wind without damage to machine.

(c) Engine started from within the enclosed body.

(d) An efficient stabilizing device.

Description of the New Military Scout Curtiss Tractor Biplane

The new Curtiss Military biplane differs considerably from the regular, standard Curtiss machines, both in design and construction. It is a large size tractor biplane of the most improved type. The wings are practically the same as used on the standard machines, except that they are made in one piece each side of the fuselage, instead of the usual panel construction, which gives them a little greater strength.

The beams are very strong and heavy at the inner end and taper all the way out to the tip of the wing, giving them the maximum of strength in proportion to the load at each point and reducing the weight.

The fuselage with the wings removed is only 42 inches wide at the points where the wings attach, and the over-all width of the running gear is about 65 inches. The tread of the wheels is 56 inches, which is standard road guage, so that the chassis may be towed along a road if necessary.

The tail surfaces and elevators are of the same general type used on the flying boat.

The fuselage is constructed of four members of white spruce, which are tapered from the rear beam out to the extreme end, thereby reducing the weight in proportion to the strain at each point. A new system of wiring and bracing is used which does not require any holes through the uprights and longitudinal members, so lighter frame pieces are used and the same strength secured as with large struts fastened in the ordinary way with bolts running through them.

The tail surfaces are quickly and easily detachable for packing up. The entire fuselage is covered in to reduce head resistance, and the seats are placed side by side as in all standard Curtiss aeroplanes. The field of view from the new machine is exceptionally good for a tractor type, as the seats are about midway between the front and rear beams over the lower planes, so that a good downward angle of vision is obtained, and for looking directly downward a space of 12 inches is left alongside the fuselage out to the first rib on each side.

The engine is located directly in front of the operators, and the carburetor projects through the dashboard into the cockpit, where it may be adjusted by either operator and is at all times under observation.

The gasoline tank is placed under the seat and has a capacity of 40 gallons. There is an auxiliary tank on the dashboard, which has a capacity of two gallons, and is kept supplied by a mechanical pump driven by the engine from the main tank. There is a plate glass window in the front of this auxiliary tank which answers two purposes—the level of gas in this tank may be seen and also the stream of gasoline coming in from the pump, and this being directly in front of the pilot, any failure of the pump to work would be quickly noted. If for any reason the pump should stop working, it is only necessary to throw over a small lever on the front of the tank which controls a distributing valve and give a few strokes on a hand air pump, which is located within easy reach of either operator, when the level in the auxiliary tank will be maintained as before by air pressure in the main tank.

The propeller is a 9 ft. diameter three-blader, driven by roller chain from the engine shaft. The motor is fitted with a 22-lb. fly wheel, and the chain used is a ¾" width, 1¼" pitch Diamond Roller, running over a 16-tooth sprocket on the engine shaft and a 30-tooth on the propeller shaft. The chain pull and propeller thrust are taken care of by a large size Schafer ball-bearing, and the rear end of the propeller shaft is carried by an ordinary Hess-Bright radial bearing. These bearings are 24 inches apart, giving ample rigidity to the propeller shaft.

The engine is mounted low, and the center of thrust is located at the center of resistance, which gives very good handling qualities. The center of gravity is slightly below the center of lift.

The radiator is mounted on the forward end just back of the propeller, and the hood over the engine is attached to the rear edge of the radiator, similar to an automobile. The air coming through the radiator and around the cylinders is deflected out on each side and away from the operators by a curved metal shield, which forms the dashboard and separates the cockpit from the motor.

All oil and smoke coming from the engine is deflected downward, so that it never gets near the operators. The hood over the engine has a small

up-curve, which deflects the air over the heads of the operators and stops the strong blast in the face, which is common in a great many tractor machines.

The new tractor is much more convenient for tearing down or reassembling than the standard machine, as the power plant and running gear stay intact when packed for shipment.

The fuselage is easily and quickly attached when setting up, the wings being in one piece are easily handled, so that the assembling can be done in a very short time.

The landing gear is fitted with efficient shock absorbers and has been tested on some very rough ground with the best possible results.

The rear wheels are 20 inches back of the center of weight, and the front wheel is just under the propeller and prevents any tendency to "nose over" in rough landings.

The machine handles exceptionally well, and may be turned around without outside assistance on the ground in a very small space. It is fitted with a standard folding shoulder yoke and dual steering wheels, which give either operator control at will. It can, however, be fitted with a single throw-over wheel if required. The general dimensions of the machine are: Spread of top plane, 37 feet 4 inches; chord, 61 inches; gap, 66 inches; length, 24 feet; weight, 1,050 pounds; speed, 60 miles an hour.

Will Hold Airboat Races.

The Aeronautical Society hopes to promote airboat sports during the coming season on the shores of Staten Island and expects to hold hydro-aeroplane demonstrations and races in the vicinity of New York. For these purposes they intend to use special one-design hydro-aeroplanes and in a discussion at a recent meeting as to the most suitable design for a racing and exhibition hydro-aeroplane the suggested design run in the July 1912 issue of AIRCRAFT was brought to the attention of the members as being one of the most suitable for this kind of work.

Hempstead Plains.

In spite of the changeable weather of the past month, activity has been on the increase at the Hempstead Plains grounds, and several builders are busy constructing and overhauling machines in anticipation of doing some early spring practicing.

The Sloane Aeroplane Company expect to be back at the Field in April with their complete school equipment of Deperdussin and Caudron monoplanes and Curtiss biplane with instructors Leonard Bonney, Guy Gilpatrick and Charles Baysdorfer in charge.

The Moisant School will also probably re-open in May and S. S. Jerwan will again be chief instructor.

F. C. Hild Enjoys Winter Flying.

On February 14, F. C. Hild in his monoplane (which is now totally enclosed and fitted with disc wheels) made a cross-country flight from the Hempstead Field to Floral Park and return, circling the Garden City Hotel, the Mineola Court House and swooping over the heads of the skaters on the Garden City Lake. While en route to Floral Park, Hild's machine developed motor trouble and he was forced to land in a corn field which he accomplished without damage. After putting his motor right he reascended at 5.40 p. m. and continued his flight back to the aerodrome, which he reached safely at 6 p. m., when it was quite dark and the moon had made its appearance.

On February 16, in full view of a good audience Hild demonstrated that it is just as easy to fly in winter as in summer, for he made eight different exhibition flights at the field and a cross-country trip over Mineola, Hempstead, Westbury and Garden City.

Augusta, Ga.

Considerable activity was noticeable at the Government Aviation Field at Augusta, Ga., during the past month. Lieuts. Sherman, Graham, Kirkland and Capt. Chandler were busy on the Curtiss and Wright biplanes, making many practice trips and several cross-country flights. Lieut. de Witt Milling has been flying the Burgess 70 H. P. tractor almost every day and this machine, although the first of its kind in this country, has shown itself to be one of the most capable flyers the army possesses.

Two new Baby Wright biplanes have arrived at the field and practice work with them is going on.

At the Moisant School instructors S. S. Jerwan and Robert Arnold have been busy teaching pupils and giving demonstration flights.

San Antonio, Texas.

In spite of the severe weather at San Antonio, much flying was accomplished at the Lillie School, Instructors Drew, Lillie and Thompson being kept busy training a large number of pupils. Among the pupils are N. M. McGuire, Reid Jones, John Schaaf of Chicago, Louis Bergenthal of Milwaukee, George Heimenau of San Antonio, Mose Hill of Brownsville, Texas; Dick Wagner, William Treblig of Houston, Texas, and Rudolph Seetak of Chicago.

Walter Brookins visited the school recently and witnessed his old chum, Andrew Drew, putting pupils through their instruction and in addition saw a wind-fighting exhibition given by DeLloyd Thompson and Andrew Drew on January 26, when they flew around the half-mile track at the Fair Grounds in a choppy wind that at times blew a gale and then died out suddenly to almost a calm, only to blow right up again. Brookins pronounced this exhibition of flying as one of the finest he has ever witnessed and complimented DeLloyd Thompson and Drew on their nerve and skill.

A diversion at the Lillie School has been the taking of a moving picture play in which the three instructor pilots appear as leading members of the cast and do the principal acting themselves, leaving only the minor parts to the regular moving picture actors. The play was written by Andrew Drew, who formerly was a journalist and has had some theatrical experience.

In order to facilitate the graduating of pupils, C. Milton Vought has been appointed official observer for San Antonio and district, and as he is on hand at the school most of the time, pupils are afforded an unusual opportunity of being able to try for their licenses at the first favorable opportunity.

Corpus Christi, Texas.

L. H. DeRemer has been training pupils on his Wright hydro-aeroplane at Corpus Christi. Recently he made a flight with H. G. Knight, city editor of the Corpus Christi *Caller* as a passenger, in which they flew out over the bay for some distance and were caught in a heavy fog, but fortunately, after cruising around for thirty minutes, they were able to sight land.

Dominguez Field, Cal.

Good flying has been accomplished at the Dominguez Field by Harry Holmes on a Schiller biplane. He has recently graduated from the Schiller School, and several of the other pupils are busy practicing. Riddell, who has proved himself an apt pupil, has been making straight flights, while Olivera, a new pupil, is grass cutting and making straight hops. F. Takamato is now doing circles and handles the machine very well in the air, but has a habit of pancaking when making landings, which does not seem altogether agreeable to the wheels.

Leonard Bonney, on the Sloane Deperdussins, has been making a number of flights carrying passengers, among whom was Grace Valentine, of the Morosco Theatre, who accompanied him on a trip over the outskirts of Los Angeles.

Guy Gilpatrick has also been doing some excellent flying on the Sloane machines, but recently had the misfortune of having his motor stop while he was rising out of a small field, and as he was heading toward some live wires, he had to make an abrupt turn, with the result that the monoplane side-slipped and landed on a wing, fortunately without seriously injuring the young but skillful pilot.

Newport Bay, Cal.

Glenn L. Martin has erected a permanent factory at East Newport, near Los Angeles, where hydro-aeroplanes will be built and tested. Martin has recently been making some splendid flights in high winds and has experienced no difficulty in arising from and alighting upon rough seas.

The 50 H. P. Martin tractor biplane is now practically completed and should shortly be ready for its trials.

San Francisco Notes.

Sam Purcell, a graduate of the Gage School, and Fred Parker are now flying their single propeller tractor biplane, which is equipped with a 50 H. P. Maximotor.

The Christofferson Aeroplane Company is busily engaged on the construction of their flying boat, the design of which was shown on the front cover of the February, 1913, AIRCRAFT. The following are the chief dimensions of the machines: Span of top plane, 47 feet; lower plane, 32 feet; chord, 5 feet 6 inches; gap, 5 feet 6 inches. The camber of the planes is 3¼ inches and the front beam sets 8 inches back, while the rear beam is 12 inches in front of the trailing edge. The hull measures 2 feet 6 inches deep, 2 feet 10 inches wide and 21 feet long. The bottom and sides of the hull up to one foot are planked with ¼ inch spruce, while the top and deck are covered with ⅛ inch mahogany. The seating capacity is for three, the pilot being in front and passengers behind, sitting side by side. A power plant will be a Curtiss 80 H. P. motor driving a 9-foot Christofferson propeller geared 1½ to 1. The centre of the propeller shaft will be 1 foot below the rear beam. The rudder and elevator are attached at the extreme rear of the hull, which is turned up a distance of 3 feet 6 inches, similar to the Donnet Leveque.

The Lougheed Hydro-aeroplane Company is now established in the same building with the Christofferson Aviation Company, having taken up half the space of the Christofferson factory. The Lougheed hydro will be tried out shortly, the motor to be used being a 60 H. P. Kirkham. The Parker-Purcell Aeroplane Company is another new one to be formed and they have erected a plant only a few blocks away from the Christofferson factory. The new company expects to build all kinds of aeroplanes and flying boats. They have plans for a new machine of the tractor type which should be quite speedy. The machine has a span of 28 feet 6 inches on the top plane, while the lower plane measures 20 feet 10 inches. The chord is 4 feet and the gap is 4 feet. At the tips the wings are swept back and have a reverse curve. The overall length is 23 feet 9 inches, and the height 7 feet 10 inches. Flexing is used for controlling lateral balance and the usual elevator flaps and rudder for longitudinal and side to side movement.

The Paterson Company are being kept busy building machines and doing repair work.

Albert S. Fry is building a Baby Nieuport, in which he intends to inst... a 30 H. P. 2-cylinder motor.

Another Nieuport type is being built by Fritz Schiller and this will be equipped with the old 25 H. P. Anzani motor which Didier Masson used on his early Blériot.

Sunset Field.

Harvey Crawford and Edward Blakely have been making some splendid exhibition flights at Alameda. On one of Blakely's flights his motor started missing and he was compelled to make a hurried descent in front of the hangars, but was prevented from landing owing to two photographers being in his way. In order to avoid running over them he was compelled to rise over them and upon landing his machine charged through a fence, fortunately without injuring the operator.

Kinloch, Mo.

Hugh Robinson and Antony Jannus have been testing the new Benoist flying boat on the river, and several fine flights have been accomplished. William H. Blakely and Robert Johnson graduated from the school on January 22. In his test flights Blakely proved himself a skillful pilot, taking the machine up to a height of 700 feet and making his landings almost directly on the mark. Johnson also flew well, but did not make such accurate landings.

Griffith Aviation Field.

J. Floyd Smith, who flies a monoplane, successfully completed his license test on January 26th.

Fred DeKor tried out his headless biplane on January 28th and made several fine flights, the machine climbing rapidly and gliding splendidly at an angle of one in nine.

Wright Company to Build Tractors.

The Wright Company, of Dayton, O., announces that they will put on the market this year a new type biplane to be known as Model E. The new machine, which is now under construction at the Wright shops, is a single propeller tractor biplane so designed that it can be taken apart for shipment in a few hours. It is presumed that the new model is the one designed to meet the new government specifications.

On April 1 the Wright Company will open their school at Simms Station, near Dayton, and Orville Wright will be personally in charge.

Weldon B. Cooke Tests New Tractor Biplane.

Weldon B. Cooke has recently constructed and tested at Sandusky, Ohio, a new tractor biplane of exceptional promise and very pleasing lines. The machine was first tested on the ice, but Cooke had the misfortune to run into a hole in the ice and the machine was considerably damaged, though Cooke himself escaped unhurt. The plane, however, has been reconstructed and flights are now being made.

Army Flying Station at Palm Beach, Fla.

An Army aviation camp has been established at Palm Beach, Fla., and Lieut. Loren Call has been appointed in charge. Most of the flying will be over water, presumably on Burgess machines, as the Burgess School is now located there, with Frank T. Coffyn in charge.

Curtiss Re-elected President.

The newly elected officers of the Curtiss Company are: The Curtiss Aeroplane Company, President, Glenn H. Curtiss; Vice-President, H. C. Genung; Secretary and Treasurer, G. Ray Hall. The Curtiss Exhibition Company, Monroe Wheeler, President; H. C. Genung, Vice-President; G. Ray Hall, Secretary and Treasurer. Curtiss Motor Company, G. H. Curtiss, President; Monroe Wheeler, Vice-President; G. Ray Hall, Secretary and Treasurer. Henry Kleckler is chief engineer of the Curtiss Aeroplane and Motor Companies.

Japanese Pilots Qualify.

The Japanese pupils of Glenn H. Curtiss, one of them an army officer, are among those who have earned their diplomas at the Curtiss School this winter. Amongst the new Curtiss graduates are Lieut. C. Yamada, Genzo Nojima, Erhard Scholvinck, William A. Helflich, Jr., Grover E. Bell and Haldemann Von Figyelmessy.

Invisible Aeroplanes for U. S. A.

It is announced that the aeronautic department of the United States Government is experimenting with a varnish which will make aeroplanes practically sky color and make them invisible at heights above a thousand feet, as outlined in an AIRCRAFT editorial nearly two years ago.

Aeroplanes to Guard Panama Canal.

The largest permanent U. S. Aviation Station is planned for Guantanamo, Cuba, a protective basis of the Panama Canal. Army flyers are already stationed there. The policy of the Govern-

ment evidently will be to guard the naval base to the limit of modern facilities. Aeroplanes have been recognized by the United States as a necessary factor in warfare and it is believed that a patrol of Guantanamo Bay will be maintained by the aviators.

Flies to Meet Train in His Benoist Biplane.

On January 24th, when A. E. Benedict, of New York, arrived on a visit to his son at St. Augustine, he was surprised to find at the station a hydro-aeroplane, with his son, Ray E. Benedict, in the seat ready to take him to North Beach. Mr. Benedict loaded his valises in the fuselage, took the passenger's seat and the machine was started and rose gracefully in the air and winged away at a height of 100 feet. Ray Benedict uses his biplane for most of his pleasure trips about the country and on the bay.

Touring by Aeroplane.

George A. Gray, who recenty set out from Jacksonville on a pleasure tour by aeroplane, arrived at Sea Breeze, Fla., on February 3rd. He landed in the grounds of the Hotel Clarendon, and stepping from his biplane, entered the hotel and registered as a guest. It has become quite a common sight now at the Clarendon to discern a speck in the sky that swoops to earth as an aeropane, out of which alights a tourist, who gives instructions to attendants to back his machine into a hangar while he goes inside and registers.

Gray's flight was remarkabe. His time from St. Augustine (his first stop) to Sea Breeze was one hour and 34 minutes. The distance, air line, is approximately sixty miles. At times he flew as high as 5,000 feet.

Hydro-aeroplanes for U. S. Battleships.

It is reported that all the battleships and cruisers are soon to be equipped with Curtiss and Burgess-Wright hydro-aeroplanes and the Chambers turret catapult for launching them. The super-dreadnoughts of the Atlantic fleet and the three scout cruisers Birmingham, Chester and Salem will probably be the first to receive the new equipment.

It is expected that the first vessels will get their equipment in time for the summer maneuvers, in which the air scouts of the navy will participate. It is the plan to confine the hydro-aeroplanes to scouting work, and during the maneuvers much of this will be done, both by daylight and night.

1913 Maximotor.

The new military Maximotor was first shown at the New York Aero Show last May, and at that time attracted a good deal of attention on account of its compactness and businesslike appearance.

The makeup of the new Military Maximotor is of the same standard that characterizes all former Maximotors. Three ball-bearing crankshaft in the 4-cylinder and four in the 6.

The oiling system consists of a submerged oil pump, which is placed in the bottom of the oil reservoir, which holds two gallons of lubricating oil. The oil pump, pumping the oil through a glass tube, surrounding the intake pipe, serves three purposes: First, as a sight feed; second, the hot oil heats the incoming gas; third, the cool air rushing through carburetor cools the hot oil, making a three-in-one combination.

The ignition is by magneto. Double sets of spark plugs are provided. Halfway relief valves are arranged so as to facilitate cranking and starting of motor. Maximotors are all arranged in such a way so that the pilot can start his own motor from seat.

The cooling system consists of a centrifugal pump and a specially designed radiator. By an original intake valve arrangement, moderate compression and ample water space surrounding the cylinders are valve-pockets, and the makers state that it is almost impossible to overheat the new Maximotors.

The 1913 Maximotor family consists of:

Model "A" 4-cylinder, 50 h. p. 4½" bore x 5" stroke.

Model "B" 4-cylinder, 60-70 h. p., 5¼" bore x 5½" stroke.

Model "C" 6-cylinder, 70-80 h. p., 4½" bore x 5" stroke.

Model "D" 6-cylinder, 90-100 h. p., 5¼" bore x 5½" stroke.

Besides these models the Maximotor makers are prepared to build on special order a 4-cylinder, 100 h. p., of 6" bore x 6" stroke, and a 6-cylinder, 150 h. p., of 6" bore x 6" stroke.

The Maximotor people will inaugurate, during the season of 1913, a novel advertising and demonstrating stunt, in which prospective buyers and visitors to the Maximotor factory will have an opportunity of seeing the Maximotor in actual flying operation. They have secured two passenger-carrying hydro-aeroplanes to give their prospective customers a real treat in actual flight. The Maximotor people feel that this is the quickest and surest way of convincing their patrons that the Maximotor is the motor they want for their 1913 power plant.

The new Military Maximotor catalog will be sent to any one, free, postpaid, who is interested in a medium priced and up-to-date aeronautic power plant.

Aeronautical Society Election.

At the annual meeting of the Aeronautical Society on the night of February 13th, in the clubhouse at 29 West Thirty-ninth street, New York City, W. Irving Twombly was elected President unanimously, together with these Vice-Presidents: Louis R. Adams, William J. Hammer, Hugo C. Gibson, Capt. W. I. Chambers, U. S. N., and Eriest D. Anderson. The Treasurer, Lewis R. Compton; the Secretary, Ludwell A. Alexander, and the Board of Directors were also unanimously chosen without an opposing vote. Ralph H. Upson, of Akron, Ohio, lectured before the society on "Balloons and Rubberized Fabric," illustrated with lantern slides.

All four of the army officers detailed for instruction in the class started December 15th have now qualified and have received diplomas of the Curtiss Training Schools. The officers graduated since January 1st have been Lieut. J. D. Parks, 14th Cav., U. S. A.; Lieut. L. H. Brereton, C. A. C., U. S. A.; Lieut. L. E. Goodier, Jr., C. A. C., U. S. A.; Lieut. Samuel McCleary, C. A. C., U. S. A. Three new civilians joined the San Diego training class recently: J. D. Hill, Portland, Ore.; J. K. Mullinger, Missouri; G. Nagaya, Vancouver. For the first spring class of 1913, opening April 15th, at Hammondsport, N. Y., all but two places have already been reserved.

Watts and Shulman With New Supply Company.

Walter E. Watts and Walter Shulman, president and secretary, respectively, of The New York Aeronautical Supply Company, have recently joined forces with a new company, The Cordeaux-Etter Mfg. Corporation with an extensive plant at 11-13-15 McKibben street, Brooklyn, N. Y. They are already in full swing in their new establishment and anticipate that their wide acquaintance in the Aeroplane Industry and among the builders will result in a largely increased interest in their line. The New York Aeronautical Supply Company's business has been merged with The Cordeaux-Etter Mfg. Corporation and from now on their place of business will be at the Brooklyn address. This company will manufacture a full line of woodwork and metal fittings and carry in stock standard parts at all times. A catalogue issued by this company lists everything from a turnbuckle to a complete "knock-down" outfit. Over 75 parts and fittings are described.

Frederick W. Gore, of Huntington, L. I., is busily engaged superintending the construction of an interesting hydro-monoplane, which he has designed with a view to securing inherent stability and a long gliding range. It is expected that the machine, which is to be equipped with a 100 H.P. motor, will be completed in May and tests will be carried out on Huntington harbor.

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BECAUSE OF
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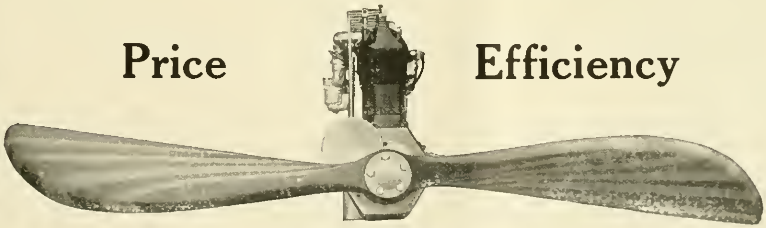

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FOR SALE—Tractor Biplane, 42 foot spread, 5 foot chord, double surfaced, Farman running gear, 8 cylinder 60 H. P. motor, Bosch magneto, Schebler carburetor, radiators, combination tank, 8 foot Paragon and Normale propellers, extra parts, tent, crates, complete exhibition outfit, would make fine hydro-aeroplane. Price $1,500.00. F. ROBINSON, 191 Caledonia Avenue, Rochester, N. Y.

ANTOINETTE AERO MOTOR FOR SALE 70 H. P. water cooled, practically unused, fine condition. Regular price, $4,000.00; going for $400.00. Also 4 Bosch Magnetos and a quantity of engine fittings. Address Box 800, care of "Aircraft."

FOR SALE

NOW FOR SALE—Snyder aeroplanes latest improved Model, fully equipped 6-cylinder 75 H. P. motor; propellers and supplies furnished; aviators wanted. THE SNYDER AEROPLANE COMPANY, Osborn, Obio.

BETH'S PATENTED Biplane Kite—Excellent Flyer; closely resembling standard flying machines; material and minute instructions to build this kite $1.00; instructions only 25c. Order one to-day. OTTO BETH, Box 589, Lynbrook, N. Y.

ROTARY AEROPLANE engine, 40 H. P., 7 cylinder, weight 160 lbs. with propeller. Cheap. Landsman Motor Co., 1406 S. 18th St., St. Louis, Mo.

FOR SALE—Brand new 50 H. P. Albatross motor with carburetor and magneto for $100. Walter Bengtson, Canby, Minn.

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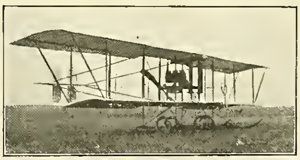

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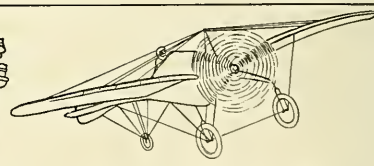

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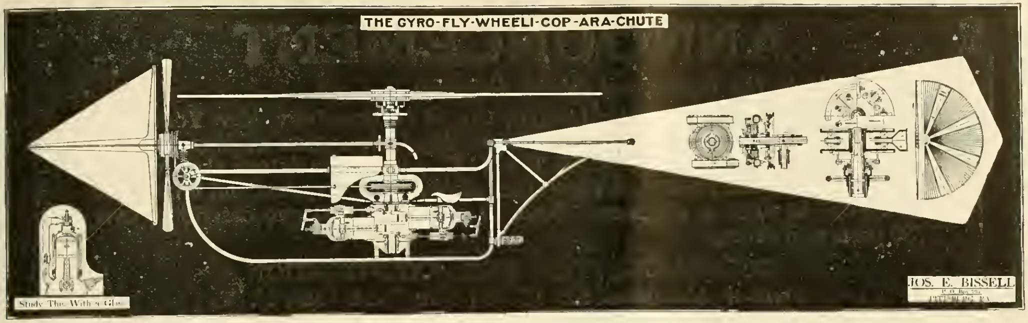

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WHY ANGELS HOOKED JOHN HENRY KING.
JOHN HENRY, BY TH' STIFF WINGS! SWORE—
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HE CARED FOR NEITHER LIFE NOR LIMB,
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POOR ASS—ASS, SURE ASS HE DROPT DEAD
FOOLS FLOCK WHERE ANGELS FEAR—T' TREAD.


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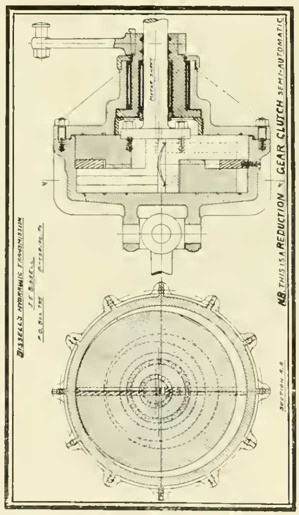

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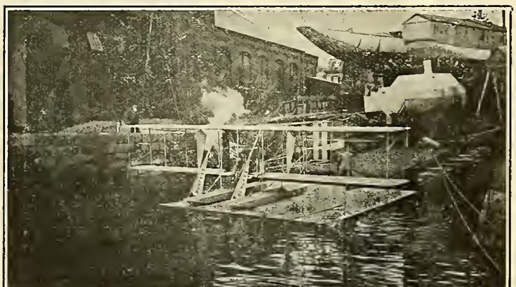

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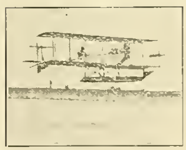

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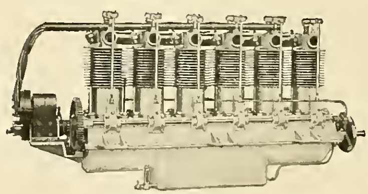

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Model D-2 16 H. P.
Model I-4 35 H. P.
Model H-6 55 H. P.
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The accompanying cut shows aviator Art Smith and Miss Aimee Cour just starting on the first elopement via aeroplane, when they flew from Ft. Wayne, Ind., to Hillsdale, Mich., on Oct. 26, 1912, and were married.

It goes without saying that any man that will undertake a trip like this with his bride-to-be must have perfect confidence in his machine, and particularly his motor. But his **Kirkham Motor** had enabled him to fill 18 exhibitions, so he knew just what it would do. Can you say as much for the other kind?

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AIRCRAFT

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The above picture, from the *London Illustrated News*, shows how the German air fleet would appear passing over London. This picture also illustrates how the same German air fleet would appear over any of our American coast cities as shown in Alfred W. Lawson's recent message to Congress, published in full in the Congressional Record, February 17th, (pages 3354-3355) and in AIRCRAFT, Volume 3, No. 12.

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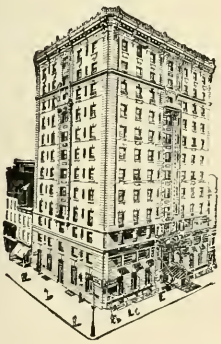

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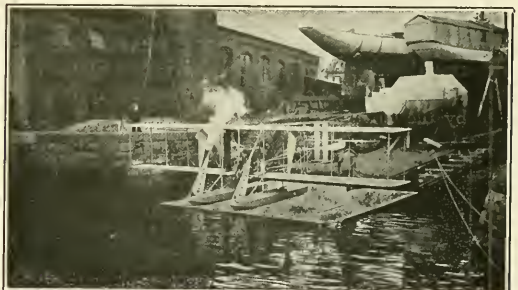

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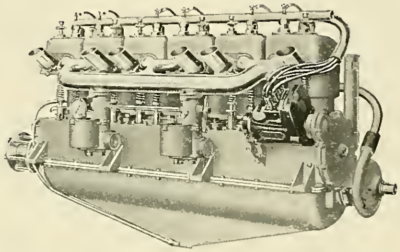

IN September 1912 the U. S. Government purchased a Sturtevant four cylinder motor installed in a Burgess aeroplane. This machine was equipped with **Starting Crank** and **Muffler** and demonstrated to the Army and Navy Officials the first successfully muffled aeronautical motor in use in the world.

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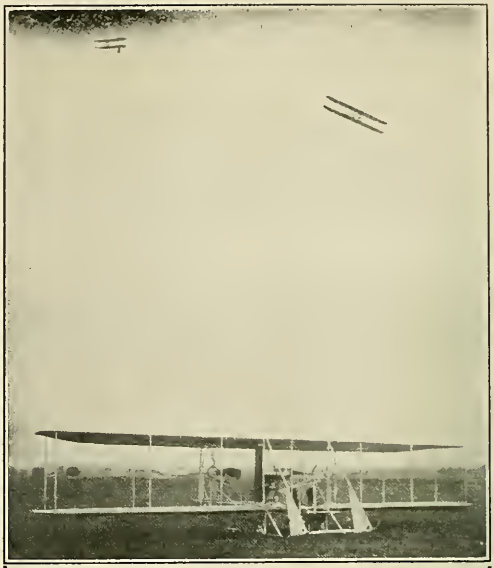

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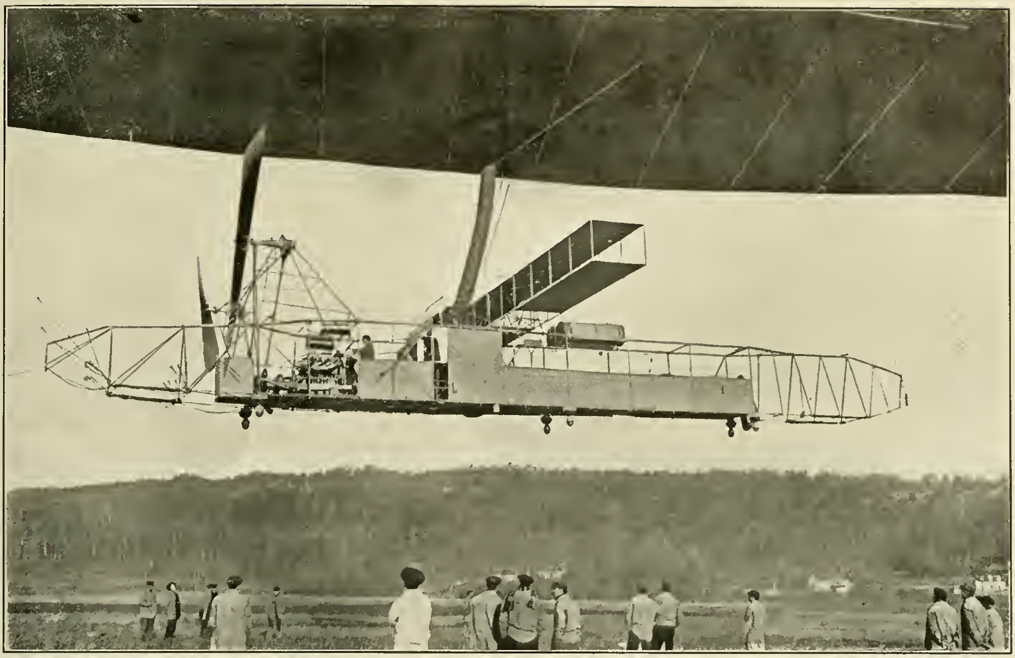

The latest Clement-Bayard dirigible is a fine example of French skill, brought about after years of enthusiasm for the lighter-than-air vehicle by M. Clement. Its envelope is of the true streamline shape with ample lifting power. The car is commodious and is slung in the most effective manner from the envelope. Two powerful propellers are carried well forward on a bridge and driven by shafts from the engine. Motive power is supplied by two Clement-Bayard motors of 150 H. P. each. The engineer is placed in a position which gives him full control, whereby the vessel secures exceptional manoeuvring qualities.

The sides of the car behind the engineer are shut in by metal panels, while above is located the commander's bridge amply protected by a wind shield. In the rear of the upper deck the air pipe connects the air pump with the ballonettes inside of the envelope. The aeroplane structure behind the air pipe is the horizontal rudders while the vertical rudder is mounted under the stern of the envelope and is not shown in this picture. The fuel and water tanks are behind the elevating device and to the rear is the passenger accommodations.

A noticeable feature are the pneumatic spherical bumpers which can plainly be seen fore and aft and centre in under the car. These take the strain off the car when alighting or resting on the ground.

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AIRCRAFT

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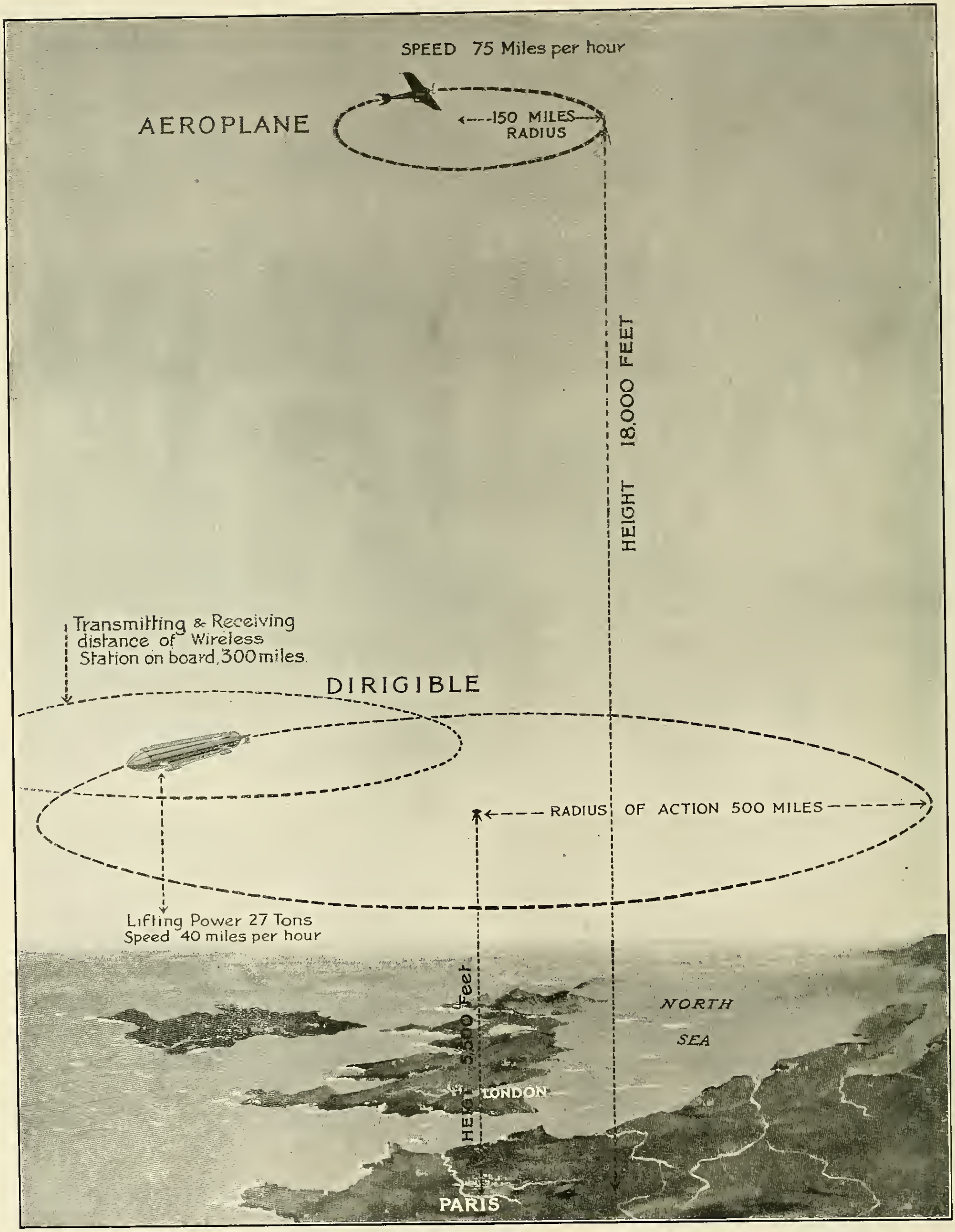


The above drawing by G. Bron, for "The Sphere" (London) is offered as a comparison between the war dirigible and the war aeroplane in speed, height and radius of action.

As will be seen, the aeroplane has the greater powers in speed and altitude but is far behind in radius of action and lifting power. Furthermore, the dirigible can carry a well-equipped wireless apparatus and is able to remain stationary over any particular place. In night work the dirigible also contains an important advantage.

The figures given above are average figures and are not extreme, as everyone knows that the aeroplane built for speed can make over 105 miles an hour, whereas the best speed of a dirigible is over 50 miles an hour.

By radius of action it must be understood that the aeroplane or dirigible is able to carry sufficient fuel to enable it to get back to its base so that a 500 mile radius of action means that the airship can travel over 1,000 miles with enough fuel and ammunition for serviceable work while the 150 mile radius of the aeroplane means that it can travel 300 miles in a serviceable condition. It must not be understood, however, from the above diagram that the aeroplane has a radius of action of 150 miles at an 18,000 feet altitude.

AIRCRAFT

Vol. 4. No. 2 — New York, April, 1913 — 25 CENTS A COPY $2.00 A YEAR

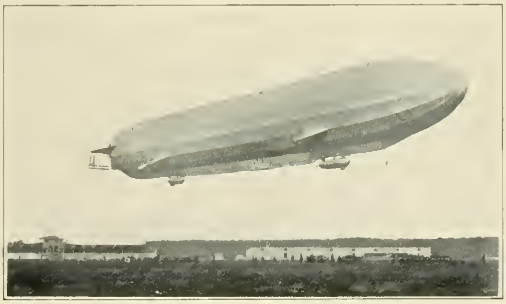
MODERN VEHICLES OF WARFARE

By T. R. MAC MECHEN

If war was declared to-morrow between Germany and France, what part would their aerial armaments have in deciding the issue? Military experts have possessed, all along, more of an intuitive than a conscious knowledge of the uses to which aircraft will be put in warfare. These experts are only now beginning to realize that the powers and limitations of aircraft will alone dictate tactics and strategy in the next war. They have awakened to the overwhelming fact that the initiative is with the air.

France and England now know that the most disastrous blows can be struck by German Zeppelins at the very outbreak of hostilities. Despising armies and navies, these airships that remain afloat for several days, can pass at night, unseen, over armies and navies and destroy an army's food and ammunition, and annihilate its horses, before that army has begun its forward march; they can cripple naval depots and railroads.

This is warfare on a scale so swift and decisive that armies and navies will resemble the pigmy toys of the child playing war on his mother's kitchen floor. That is exactly the situation to which the art of war has been brought by the advent of Germany's mammoth air-cruisers which use the illimitable air as the theater of their operations. The German Chinee of Europe has indeed thrown dust into the eyes of his antagonists. He is ready to strike vital blows.



The German military dirigible "L I," which the Germans consider to be superior to anything of its kind in the world. The "L I" belongs to the German Navy. Her carrying capacity is 27 tons and her radius of action over 500 miles, while her speed with her own motors, irrespective of air currents, is 50 miles an hour.

The wireless station on board can transmit and receive messages at a distance of 310 miles. The "L I" is capable of carrying in time of war two tons of explosive bombs in addition to crew, fuel and ballast sufficient for 31 hours in the air.

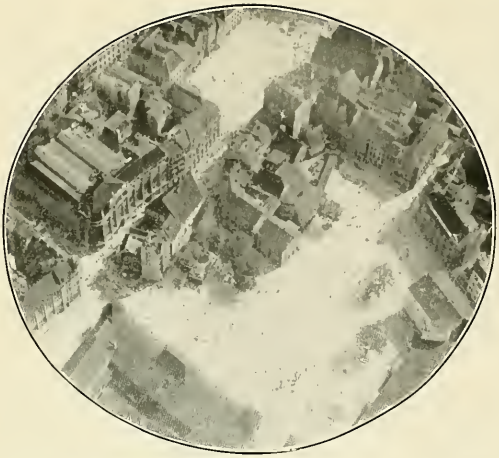
There are several other Zeppelins that can do almost as good service.

Z 1, Z 2, Z 3 and Z 4 belong to the Army, while the "Viktoria Luise" and "Hansa" are private Zeppelins which can be pressed into the military service whenever the government requires them.

The world should understand that Germany has developed an instrument that may compel the peace of Europe. It is an instrument that stays aloft in bad weather, for periods of thirty to forty hours, that travels unerringly at night, through fog and above clouds. This means that its mission is to operate unseen, often to strike unseen. In its present undeveloped size, it makes headway against winds up to fifty miles an hour. A Zeppelin never fails to reach its destination—something that cannot be said of any other air-machine. Moreover, a Zeppelin's guns, bombs and ammunition have been invented and its target practice has been perfected.

During February, of this year, the new military Zeppelin 15, operating at an altitude of 4,500 feet above Hagenau, the shooting grounds near Baden-Baden, cast loaded bombs of 220 pounds, filled with a special high explosive. Authoritative information reveals the fact that these bombs invariably hit the mark, and they destroy everything within a radius of 175 yards. This practice was not mere good luck. During the same month, the new marine Zeppelin and the passenger Zeppelin Hansa, while maneuvering at the same height, appeared so suddenly from unexpected quarters, that the gunners on the artillery grounds at Doeberitz did not have time to estimate the airships' height and whereabouts in space, before both ships had cast dummy bombs. The missiles dropped squarely on the battery that served as a target, and the airships were gone three minutes before the artillerymen could sight the floating marks.

All this time the two airships were in constant wireless communication with each other, and also with the military station at Johannisthal. More recently, in fact, on March 1, the marine Zeppelin, during a flight of 12 hours, maintained unbroken wireless communication with its home station. These repeated tests have proved the Zeppelin airship's exact value in the next war as much as if the German government had already used her new instrument in actual conflict. The General Staff of the German Army and the Admiralty Board, following the most conclusive tests, made repeatedly in remote parts of Germany, know that this formidable weapon will destroy the enemy's lines of approach marches and annihilate their supply trains and otherwise cripple the mobolization of an army. The Admiralty has been thoroughly satisfied that it can depend on a Zeppelin to observe hostile naval fleets from great distances and invulnerable heights, while from invulnerable altitudes it will destroy and sink battleships. Conclusive demonstrations have shown that the airship gunners can unerringly hit the mark, at long range. Shells have pierced protective covers, such as the armor plate of a battleship's superstructure. It has been shown that these shells have the power to explode magazines. All this without getting any closer to the enemy than permits the airship to withdraw at the first sign of danger to itself.



The kind of target a military dirigible would have; a section of a German town as seen from above.

An airship that remains in the air for 31 hours and travels through fog, by day and night, while covering 1,067 miles, is a craft that will easily reach any part of England and most of France. That is the world's record made by the new marine Zeppelin, which ascended from Friedrichshafen, on the Swiss frontier, in a dense fog during the dawn of Oct. 13, 1912, and was never seen from the ground, until shortly before her arrival at Berlin, at 3 o'clock on the afternoon of Oct. 14. Shortly after midnight, on Oct. 14th, a strange airship was reported overhead at Sheerness, the military outpost near the mouth of the Thames, England. Though Germany officially denied that this airship was her marine Zeppelin, the statement is not believed in British military circles.

The fog and weak wind on that day all over Germany and the North Sea at least furnished an ideal condition for an "attack" on England. It would have been intelligent attack. The airship's commander "talked" by wireless with all the military stations and weather stations throughout eastern Germany during the entire voyage. Though he could not see the ground for the fog, he steadily maintained, by scientific reckoning, a course northeast to the North Sea. He knew where he was all the time. He carried a crew of twenty sailors and fighting men. The airship had fuel for fifty hours and two tons of extra lifting force for guns and ammunition. Take the work done by the Zeppelins during their shooting tests and transfer this execution to points in the air above the British military station. All technical Europe laughs, even England laughs at Parliament's recent legislation, which threatens foreign aircraft with British guns.

That the ground is helpless has already been demonstrated in actual war. It has been demonstrated, mark you, by a poor little captive balloon, a stationary object sent up above Adrianople, to observe the Bulgarian army. That balloon removed all doubt of the impotency of guns on the earth firing at a swiftly moving airship, a mile high in the sky. Philip Gibbs, the special correspondent of the London Sphere, watched the Bulgarian gunners trying to hit the balloon with those fine French Creusot cannon. He writes that he watched them shooting at it for more than one hour. They never did hit it. He saw shells burst to the right and to the left of the balloon. He saw them burst above and below it. And, though it was a stationary mark, it passed through the fiery ordeal unscathed. The observers in its basket were indeed heroes.

Now, what chance has artillery to hit a Zeppelin moving fifty to sixty miles an hour through the free and empty sky? A Zeppelin not only manuevering at much greater height than this balloon, but manuevering at a constantly changing height and in constantly changing directions.

Take another picture of actual warfare. In the Italo-Turkish War in Tripoli, the small dirigibles P. I and P. II frequently accomplished the mission of penetrating to the heart of the Turkish position while flying at an altitude of 6,000 feet, and from that height they deliberately took photographs of the entire Turkish lines, while musketry and artillery bombarded the aerial spies but never once touched the airships. Now and then the airmen dropped a good-sized bomb on Turkish heads, as a compliment. They returned to their own headquarters with such complete reports of the enemy's numbers and position that every secret was laid as bare as if it had been revealed by a moving picture machine.

Some will immediately point out the fact that aeroplanes have been hit in both the Tripolitan and the Balkan Wars.

To illustrate the so-called "black shadow of the airship" the above map of journeys possible to aeroplanes and dirigibles was recently published by the "Review of Reviews" (London), whose editor notes: "The first circle of 125 miles from Heligoland gives the out and home journey of an aeroplane; the 250 mile circle is the outward journey only. The 300 mile circle is the out and home journey of an airship; the 600 mile circle is the outermost line; that is practically the limit of an airship journey with any hope of return."

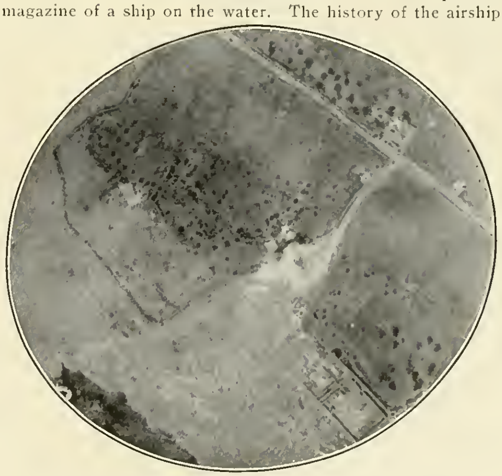
To illustrate the arguments that the British Isles are at the mercy of the German airships, the above map of distances was published in the "Review of Reviews" (London), whose editor makes the following remarks: "It should be noted that the most vital naval and military centres of the Kingdom are those most accessible from Germany, Cologne being in far more dangerous proximity than Heligoland to the southern or even to the eastern counties, Belgium being the only eastern country necessary to pass over by making a very slight detour to the north of Calais. This is allowed for in the distance given."

True, but did the reader ever hear of any balloon or airship being hit in actual war? The explanation is easy. The aeroplane scout moves so swiftly over a mass of detailed troops that it has been found necessary to fly comparatively low to be able to see distinctly. The information obtained by the observers must be accurate information. In flying low the aeroplane gets within the range of the rifle, wielded by the arm of an infantryman. The infantryman keeps the moving aircraft covered exactly as a duck-shooter wings his bird. The musket is the most dangerous of all weapons against a craft in the air. But it is different with the airship. It is a buoyant vessel, it can hover motionless, cruise slowly or fly fast overhead, without falling to earth, if it slows up its speed. This is something the aeroplane can never do. The vision from the airship to the ground is much steadier, much clearer and more deliberate than from an aeroplane. The steady airship brings into play powerful glasses that are deliberately held on the objects 6,000 feet below. In every army in Europe it is now realized that for thorough reconnoisance, for actual information, the airship is incomparable. And, at the same time, it carries real guns, real bombs—large enough to be really destructive, to strike vital blows.

In making a direct attack, it is an accepted axiom of a Zeppelin's navigation, that its attack must be made at full speed, going with the wind. This gives one of the new sixty-mile (four-motor) Zeppelins now being built, a velocity of say at least seventy miles over the ground. The situation should make artillery utterly impotent, since the airship cannot be sighted with sufficient rapidity, wholly apart from the further mathematical difficulty of getting the range of a floating object in space. Gunners on the ground must rely on chance shots. Then, to-morrow, bombs dropped from an airship will necessarily produce havoc, with small chance of harming the airship.

Germany is not training her airship crews to ignore the fact that in the next war there will be opposition in the air. She has given more study to the relative risks of airship and aeroplane than any other country. A maze of intuitive, rather than conscious criticism, has been launched about the grave dangers to which the airship will be exposed by aeroplanes. These critics either have been badly informed on technical and physical science, or they have been expressing superficial opinions. Their objections to the effectiveness of the airship have been based chiefly on three erroneous grounds: (1) That the airship's speed is slower than that of fast aeroplanes; (2) Inability to handle its vast bulk in high winds; (3) Inherent danger of ignition from its gas. Each of these fallacies have been exposed by actual practice.

Let us look at the last two objections. A Zeppelin's bulk is not vast. Take an ordinary lead-pencil. Its polygon shape is an exact imitation of a Zeppelin. The lead-pencil has no more exposed surface for the power and execution that lies in its lead than a Zeppelin has exposed surface for the power it possesses in engines and guns. In the immensity of space the point that a Zeppelin presents head-on is no greater in proportion than the lead-pencil's point. A Zeppelin is as rigid as a lead-pencil. So it mounts guns at its bow and stern, on its top and under its belly. These weapons cover space in all directions. They are put there to protect the airship from aeroplane attacks, from above, from the sides or from below. So much for the superiority of armament, which is composed of much longer range guns than any aeroplane can possibly carry. It is sufficient to say, in commenting on the danger of ignition from gas that there is no more danger of this than there is from the powder magazine of a ship on the water. The history of the airship



The damage a dirigible can do; the oasis of Ghariunes fired by a bomb dropped by military air-men.

has yet to show a single explosion from this cause. The airship's motors and magazine are as well protected as the magazine of a warship.

The answer to the first objection, that of the airship's inferior speed, is that the German Army Staff and the Admiralty Board have thoroughly tested the danger from fast aeroplanes and have determined by actual tests that a Zeppelin has nothing to fear from that source. This is the reason that a fleet of twenty Zeppelins and ten Schuette-Lanz (rigid) airships have been ordered by both these branches of the military service. All of the later airships are to make sixty miles an hour and upwards, while the present Zeppelins all make fifty miles an hour. No aeroplane yet devised, when carrying the heavy load which it must carry to become an offensive air-machine, makes more than sixty miles an hour. It is generally recognized in European armies that the fastest monoplanes are not effective as offensive weapons. Too much of their power is used up in power plants and fuel. Again, the technicalities of all monoplane construction, due to their underspread and obstructing wings, prevent a gunner from seeing directly under him. They can make a frontal attack on an airship if other considerations were not in the way. The aeroplane's severest test comes in climbing. Much of its endurance will be expended in attempting to reach the constantly higher level to which an airship will continue to ascend when it sights hostile aeroplanes. At the same time the airship—German tests have shown that a Zeppelin climbs faster than their fastest monoplanes—will run from the aeroplane, thus coaxing it to use up more and more of its strength. Meanwhile the airship, with its greater ammunition supply and its longer range guns, will subject the aeroplanes to the fire of shrapnell which spreads over a radius of fifty yards and to a constant stream of machine gun fire—a stream of 500 to 600 bullets a minute, directed by the gunner as easily as a gardener directs his hose.

On March 15th a machine gun mounted on the upper deck of the "L Z 16," the second marine Zeppelin, fired 500 rounds of ball cartridges, with ease and precision although the airship was flying at the rate of 22 yards a second or 45 miles an hour into the teeth of a strong westerly wind. The final consideration is that Germany's best aeroplanes will be employed to always act as a torpedo escort for every airship, for the purpose of repelling the enemy's aeroplane attacks. In Germany this training has progressed to the point where a supply airship replenishes its aeroplane host, thus prolonging their flight. All this would seem very largely to dispose of the idea of the danger to the airship from aeroplanes.

What are dangerous aeroplanes? The most dangerous are those which carry the largest guns, the most ammunition and the most fuel. These are biplanes. Biplanes loaded with the required 660 additional pounds, have only made 58 miles an hour in actual competition. Thus, the really effective aeroplane for either attacking an airship or attacking the ground, is or will soon be slower than the airship, unless we build much larger biplanes, which must be operated by crews. If war broke out tomorrow it would find the airship, as developed by the German, much better prepared to give an account of itself than the best aeroplane yet constructed.

The strength and stability of the largest Zeppelins has been demonstrated by more than 900 landings in the last two years.

Crews have been trained to handle them perfectly. The unfailing Maybach motor of 1,000 pounds, owned and built by the Zeppelin works, is the only absolutely reliable aerial motor in the world—an automatic wonder that runs itself and never stops. Thus, the airship is a perfectly handled vehicle in the air, in the worst storms. Its motors can be repaired right on the ship while underway. In fact, a Zeppelin now does its work as automatically as any steamer.

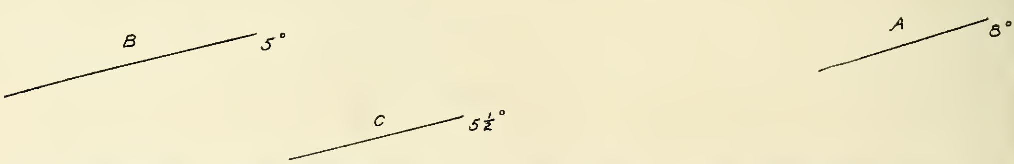
These demonstrations show that we have arrived at war in the air. To that end all technical development is rapidly producing craft which have offensive and defensive power. Naturally, when we raise war from the ground into the heights of the air, the craft possessing the greatest endurance, the greatest carrying capacity, and this also means the most effective armament, is the craft that will strike the most decisive blow. This means naval warfare lifted into the air and we know that in this kind of warfare the man who can out-shoot the other fellow is the man who will win.

THE DRZEWIECKI SYSTEM VS. EIFFEL'S TANDEM No. 2

By ALBERT ADAMS MERRILL

PROF. S. P. LANGLEY was the first to make a large-size model flying machine which really made a successful trip through the air. In this machine Langley used tandem surfaces. After the death of Langley and up to within a year nothing important was done with tandem surfaces. The success of the Wright Brothers with the biplane and of Blériot with the monoplane was followed by many imitators, and the true value inherent in tandem surfaces was not known to the public until Eiffel's experiments were published. Langley did not know the value inherent in a proper disposition of tandem surfaces, for the chords of his surfaces were parallel.

Fig. I



My attention was called to the value of downwardly converging tandem surfaces by seeing some small models glide, and by listening to a theory of Mr. R. D. Andrews. This was over three years ago, and I became convinced of the fore and aft stability of this system, but I was very skeptical of the efficiency. Therefore, it was with very great interest and considerable astonishment that I read what Eiffel had to say about them.

I would say to begin with that tandem No. 2 is composed of two surfaces equal in area, having a camber of 1 in 13.5 spaced apart a distance twice the chord. When the angle of the front surface is +2½°, the angle of the rear surface is 0°, and the front edge of the rear surface touches the backward projection of the chord of the front surface. Thus the surfaces converge downwardly.

In Drzewiecki's system the area of the front surface is to the area of the rear surface as 8 is to 18, the angle of the front is +8°, of the rear +5°, and the distance apart is about three times the chord of the front surface. The front surface is

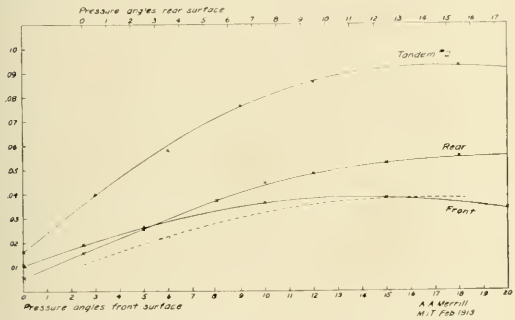
Eiffel's No. 8, rear surface is Eiffel's No. 13 bis, and the rear surface is placed several feet above the backward projection of the chord of the front surface. Thus they *converge upwardly*. I wish particularly to call attention to this last condition, as I believe it has a bearing on efficiency.

In Fig. 1 A represents the front surface of both systems. B is the rear surface of the Drzewiecki system, and C the rear surface of Tandem No. 2.

I will consider first the fore and aft stability of Tandem No. 2. Fig. 2 represents the lift of this system. The curve of the tandem is obtained direct from Eiffel's tables, the front surface curve is obtained from the table of that curve *alone*, and the rear surface curve is the difference between the two.

Note that as the angle increases from zero, the lift of the rear surface increases faster than the lift of the front surface; hence no matter what change occurs in the pressure angle a righting couple always is introduced. This also means that it would be a difficult matter to stall the machine or to make it dive steeply. Moreover, a stabilizer like the Doutre would be of little value here because the pressure angle is kept constant by the disposition of the supporting surfaces, and not by the horizontal rudder.

The existence of stabilizers, like that of Doutre, has always seemed to me to be evidence that designers did not go deeply enough into the relation between the forces involved in flying, because the Doutre stabilizer is simply a mechanical and automatic means of producing a couple which shall offset that very



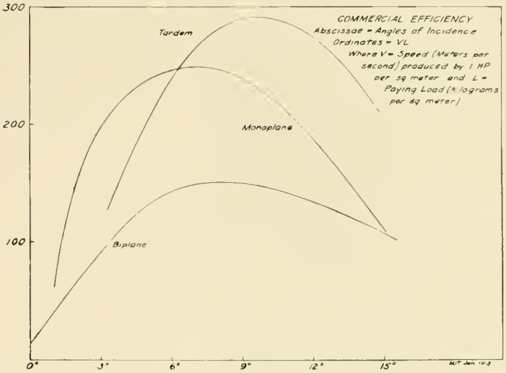
dangerous couple produced by the false movement of the c. p. in both monoplane and biplane.

Manifestly the thing to do is to get a system in which the movement of the c. p. always produces a righting couple and converging tandem surfaces is such a system. The Doutre stabilizer does not cure an evil, it simply covers it up and gives a false sense of security.

Stability must come from the disposition of the supporting surfaces and not from the movement of an auxiliary surface. How safe and practical would a boat be if its stability depended upon the constant movement of the rudder?

In Fig. 2 the broken line represents the lift on a single surface of the same area and camber and having the same pressure angle as the rear surface of the tandem. Now we come to the most remarkable thing about this system. Remember that the front and rear surfaces are *equal in size and in camber* yet the rear surface lifts more at 6½° than the front lifts at 9°, and it lifts over 30% more at this angle than it would lift if the front surface was taken away. No such gain in lift can be shown by the Drzewiecki system because, although the rear surface in this system lifts more than the front, and has a smaller pressure angle than the front, the rear surface is over twice as large as the front surface, so that its lift *per unit area* is less than the lift of the front surface.

From some graphs of the Drzwiecki system published in *L'Aerophile* for January 15 I have worked out the Ky for the rear surface at all angles from 0° to 13° and I find that the rear surface lifts about what it would lift if alone.



The method is as follows:

From the graphs in *L'Aerophile* we get $\frac{Ry}{R'y} = \frac{4}{3}$ at 8° and 5°, where Ry = total lift on rear surface. R'y = lift on front surface. The rear surface has an area of 18 m. q., the front surface 8 m. q.

$$\therefore Ky = \frac{4}{18} \text{ and } K'y = \frac{3}{8}$$

This represents the lift per unit area:

$$\therefore \frac{Ky}{K'y} = \frac{4}{18} \times \frac{8}{3} = \frac{16}{27}$$

Eiffel gives for the front surface (No. 8 at 8°) K'y = .058.

$$\therefore Ky = \frac{.058 \times 16}{27} = .03437$$

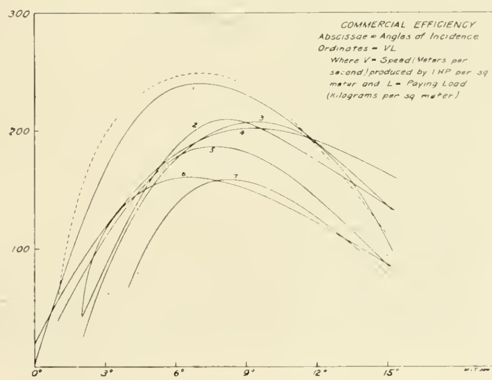
This is the value of the lift per unit area on the rear surface (No 13 bis at 5°) of the Drzewiecki system. The lift of this surface *alone* at 5° is .0345. It has been stated in a recently published article that the lift of this surface at 5° is about .041, but this is an error. The lift of Eiffel's No. 13 is .041, but Drzewiecki uses No. 13 bis, which is a very different surface. Turning now to Tandem No. 2 (Fig. 2) note that at 5° for the rear surface, the lift is 29% more than the lift of the same surface *alone* (broken line).

Figuring the Rx for the Drzewiecki system at 8° and 5° we get for the front surface (No. 8 at 8°) .0061 (K'x) × 8 = .0488; for the rear surface (No. 13 bis at 5°) .0027 × 18 = .0486.

$$\therefore Rx = .0488 + .0486 = .0974$$

$$Ry = .058 \times 8 + .03437 \times 18 = 1.083$$

$$\frac{Rx}{Ry} = \frac{.0974}{1.083} = .08994$$



This gives an aerodynamic efficiency about equal to a Breguet single surface at 7°.

The second chart in *L'Aerophile* gives values of $\frac{Rx}{Ry}$ for the model. At 8° and 5° (0° on the chart) this value is $\frac{11}{65} = .169$.

For the system alone without head resistance we got

$$\frac{Rx}{Ry} = \frac{.0974}{1.083}$$

Now it is evident that to this we must add head resistance in order to get $\frac{11}{65}$ $\therefore$ $\frac{.0974 + x}{1.085} = \frac{11}{65}$

and $x = \frac{1.085 \times 11}{65} - .0974 = .0859$.

This value is equivalent to the resistance of about 1 m. q. normal to the wind, so that in this model the head resistance has been kept very low.

The value of $\frac{Rx}{Ry}$ for the whole machine is .169, the weight is given as 750 kg. and the probable speed at about 100 km. per hour, or 27.77 m. p. s.

$\therefore \frac{750 \times .169 \times 27.77}{75} = 46.93$, the h. p. consumed. The engine to be used is said to be of 70 h. p., and this should be ample. From the evidence in *L'Aerophile* it appears that the full-sized machine is well designed and will have inherent fore and aft stability, but it is not as efficient as Tandem No. 2, as I will now show.

In Fig. 3 is shown what I call commercial efficiency. The paying load is the total lift minus the net weight, which in these graphs is figured as 10 kg. per m. q.

The broken line represents a camber of 1 in 13.5, No. 1 is Breguet, 2 and 3 are Blériot wings, 4 is the wing of a bird, 5 is Wright, 6 is Voisin and 7 is M. Farman. They are all monoplanes and head resistance equivalent to 1/20 the supporting area has been added in order to make the graphs represent actual practice.

Fig. 4 represents different dispositions, but equal areas and camber. Note that a difference in disposition has more effect upon efficiency than a difference in camber.

The Drzewiecki system rated on this basis runs between the broken line and curve No. 1 in Fig. 3.

The cause of the stability lies in the fact that the two surfaces have different pressure angles, that of the front being larger. The cause of the increased efficiency of Eiffel's Tandem No. 2 over the other tandem is probably due to the position, not the angle, of the rear surface relative to the wake of the front surface.

Of course the soundness of the conclusions I have set down here depends upon the accuracy of the graphs in *L'Aerophile* and Eiffel's co-efficients, but there would have to be an error of 20% in the graphs to make my conclusions wrong.

THE WRIGHT CURTISS DECISION

By DENYS P. MYERS

On February 27, 1913, Judge John R. Hazel, of the United States District Court, western district of New York, handed down a decision favorable to the complainant in Wright Company *vs.* the Herring-Curtiss Company and Glenn H. Curtiss. But the judge closed by saying that "because of the importance of the litigation and of the questions involved, a *supersedeas* will be allowed upon condition that an appeal be diligently prosecuted." The Curtiss offices announce an appeal and state that patents recently granted on their methods of steering and balancing, the general scientific recognition of the Curtiss inventions and widespread governmental recognition of their aeroplane "sustain us in the feeling that the result of an appeal will be favorable to us." So there is at least another lap to go in the litigation.

On January 3, 1910, the same judge, sitting in circuit, held the Wright patent infringed in a motion for preliminary injuncton, and on June 14, 1910, the Federal Circuit Court of Appeals, second circuit, *per curiam,* held the preliminary injunction not warranted by the proofs. The most recent decision is therefore the first dealing directly with the claims of the litigants on their merits. The decision, of course, satisfies the Wrights, but the Curtiss firm express confidence in securing another reversal of Judge Hazel and state that, "pending the final decision on the appeal, our business will continue as usual." It therefore appears that the effect of the recent decision does not much alter the uncertainty which has existed for three years, except that one side has scored another point.

It is not necessary to recall in detail the Wright basis of claim for infringement, that the combination of warpable wing ends, "lateral marginal portions capable of movement," as the claim says, with a vertical rudder moving in conjunction "toward that side of the machine presenting the smaller angle of incidence and the least resistance to the atmosphere" constitutes a basic principle of heavier-than-air flight which has essentially been adapted by the defendant. The defenses are: 1. That the patent is not entitled to a broad construction. 2. That if it is broadly construed it is invalid in view of the prior art. 3. That if properly construed as to its scope the defendants do not infringe. 4. That in any event the defendants' mode of flying is on a different principle from complainants'. (Decision, Mss., p. 4.)

The points raised in the first two defenses are dealt with together by the learned judge. "The prior art taught that Langley, Lilienthal, Chanute, Maxim and others had faithfully endeavored to solve the difficulties and remedy the imperfections in apparatus . . . but no one had flown save a few * * * who were engaged in experimentation. In this situation the patentees conceived the idea" of their own combination, whose history and development is traced. "To induce a construction of the claims in controversy that will exclude defendants' aeroplanes it is contended that the patentees merely improved the known gliding machine" and that its parts "were old separately and in combination." Referring to Chanute's review of the aeroplane up to 1897, the court says "his descriptions were not sufficiently definite to suggest the later improvements by the patentees. . . . and it is not contended by the defendants that they were anticipatory of the claims in suit."

"That the prior patents do not show the patented combination of complainant's construction is evident from an examination thereof," continues the court, and describes the Henson British patent of 1842, the Maxim of 1889, the Manchester, Crepar and Johnston, Herte, Mouillard and Boulton patents. Mentioning the revived Mattullath application for patent, he definitely throws it out of consideration, as he does the Ader article of 1893. The Voisin machine is defined as of another order, and also the Schroeder German patent of 1894. Summarizing, he says: "The prior separate use of such elements is freely admitted by the patentees, but they assert, rightly I think, that the patented combination was a new combination performing a new and novel

result. The antecedent patents, the efforts to perfect the gliding machine and to provide means for restoring equilibrium, in short, the many unsuccessful attempts to remedy existing imperfections in aerial machinery all bear witness to the fact that the achievement of the patentees required the exercise of the inventive faculty. Having attained success where others failed, they may rightly be considered pioneer inventors."

The third contention of the defendant, non-infringement, worked out as a technical attack on the patent claims. It was argued that the Wrights intended to build planes "normally substantially flat," which were never used; "that the vertical rudder is useful merely to equalize resistance; that the patent fails to disclose the manner of effecting the equalization of the differences of air pressure; that "by the warping maneuver the complainant's machine has to be turned from its course to avoid upsetting, and "that the defendants' aeroplane is radically different from complainants'. They also claim that it was not until the vertical rudder was constructed to move independently of the ailerons, as in defendants' aeroplane, that an operative device was produced." Discussion of these claims by the court was long and legally technical.

As to the shape of the planes, it was held the claim was broad enough to cover curved planes, since "the patentees did not limit themselves to the precise details of construction." Failure to mention a motor was deemed not essential, that presenting no problem. "The employment, in a changed form, of the warping feature or its equivalent by another, even though better effects or results are obtained, does not avoid infringement. . . . It is next contended that defendants' aeroplane does not infringe as its ailerons do not move in either direction above or below the normal plane of the body portion, but any such alteration, however, is immaterial as defendants' planes move at different angles relative to the aeroplane and to each other and attain the substantial result of the Wright patent." There is the question of whether the aileron infringes the wing-warping device. Judge Hazel cites the Wright claims in their patent and says: "The said claims must be given an interpretation of sufficiently wide scope to cover the appropriation of the substance of the invention or the equialent means by which the principle is applied to an aeroplane of the type described in the patent in suit." He evidently does not contemplate the monoplane.

The defense as to the modes of flying differed hinged on the question of whether or not there "is in defendants' machine a tendency to spin or swerve which is checked or counteracted by the operation of its vertical rudder." The learned judge describes the disputed parts of both machines minutely. "If I am correct in my interpretation of (Wright patent) claim 3 and the rule of law applicable thereto, the ailerons of defendants' construction and the manner of using them are within its scope." He quotes the testimony of fliers, Curtiss, Willard, Captain Beck, Lieutenant Ellyson, Post and Lieutenant Milling.

"The testimony of witnesses who have flown the defendants' aeroplane and swear that the rear rudder is not in fact used for recovering lateral balance, but that such function is performed solely by the ailerons, would ordinarily be entitled to greater weight than the opinions of experts . . . and would in this case, were it not that there is cogent evidence tending to modify or qualify their denials of the use of the vertical rudder except for steering.

"Willard concedes that the rear rudder is turned to the high side to gain additional restoring power; that it is used as a 'separate agent to accomplish a desired result more quickly or more positively.' In the Curtiss letter in evidence it is substantially admitted that the rear rudder is turned toward the high side at times *to assist in balancing* (*sic*) the machine by steering or turning." Lieutenant Milling's experience of having to use the rudder to right himself in gusty weather is adduced textually. "That would seem to bear out the assertion that the rear rudder is used to correct the differences of resistance, and not merely to recover from an unusual tilt due to untoward causes. * * * The fact is clear that it does on occasion assist the ailerons in restoring equilibrium. That it is capable of action separately from the ailerons, or that it is turned to the high side only on extraordinary occasions, or that it is primarily for use in steering and only incidentally to assist in restoring balance when abnormally tilted, does not avoid infringement."

"The defendants," concludes Judge Hazel, "have embodied in their aeroplane the various elements of the claims in suit (Nos. 3, 7, 14 and 15 of the Wright patent). While it is true, as pointed out herein, that the defendants have constructed their machine somewhat differently from complainant's and do not at all times and on all occasions operate the same on the Wright principle, yet the changes they have made in their construction relates to form only. They have constructed their machine so that it is capable of restoring equilibrium in substantially the same way as is complainant's machine, and the evidence is that, on occasions, they use the vertical rudder not only to steer the machine, but to assist the ailerons in restoring balance. . . . The questions of law in the case are important, but the questions of fact are controlling, and in view of the novelty of the claims and their scope, the question of the infringement is resolved adversely to the defendants as to the claims which are the subject of this contoversy." The learned judge then provides for entering a decree, but, as before mentioned, grants the Curtiss interests a stay of proceedings pending appeal.

ITALIAN MILITARY DIRIGIBLES

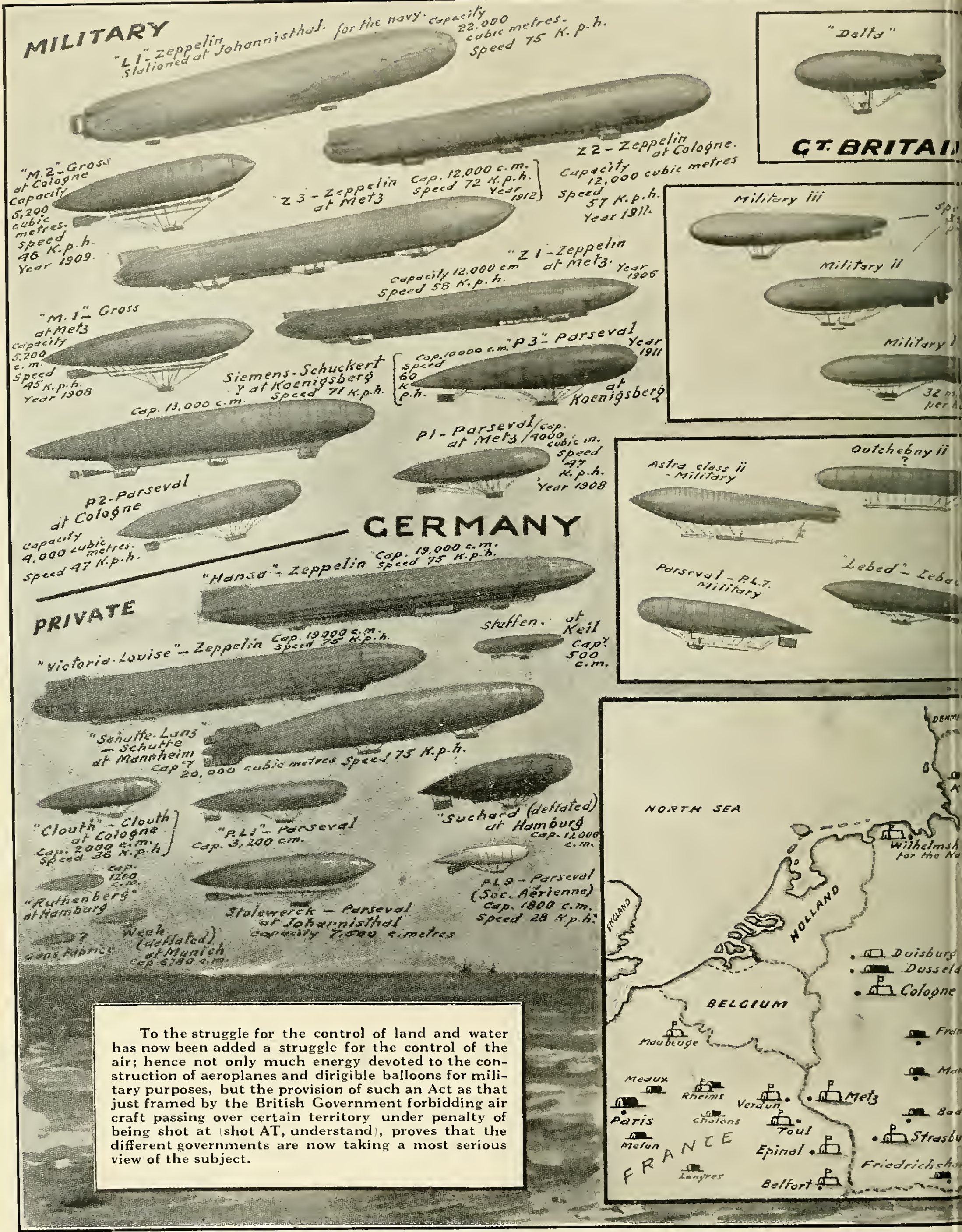
Name	Type	Year	Capacity Cubic Metres	Length Feet	Diameter Feet	Speed M. P. H.	ENGINE			Useful Load Pounds
							No.	Total H.P.	Make	
P 1	P	1907	4,200	197	38	33	1	100	Clement-Bayard	3,000
P 2	P	1910	4,300	207	38	35	1	120	Clement-Bayard	3,700
P 3	P	1910	4,300	207	38	35	1	120	Clement-Bayard	3,700
P 4	P	1912	4,700	207	39	38	2	160	Fiat	4,600
P 5	P	1913	4,700	207	39	38	2	160	Fiat	....
M 1	M	1912	12,000	272	56	44	2	500	Fiat	9,000
M 2	M	1913	12,000	272	56	48	4	500	Wolseley	9,000

The above table gives the details of the military dirigibles now in the possession of the Italian government, but not those recently ordered. All these dirigibles have been built under the supervision of Captain Crocco at the military works adjoining Lake Bracciano, near Rome. Although all of the same type—the semi-rigid, with a flexible jointed metal keel, which forms the intermediary between the car and the hull—are divided into three classes, designated respectively by the letters P, M and G (small, medium and large). Of these there are in existence five dirigibles of the P class and two of the M class, while several others, notably two craft of the G class, are under construction.

The most remarkable features of these dirigibles are the flexible keel frame-work and the propellers, which are reversible and have a variable pitch. P 2 and P 3 took part in the operations at Tripoli. The speed of M 1 and M 2 probably exceeds the figures given, though these are official.

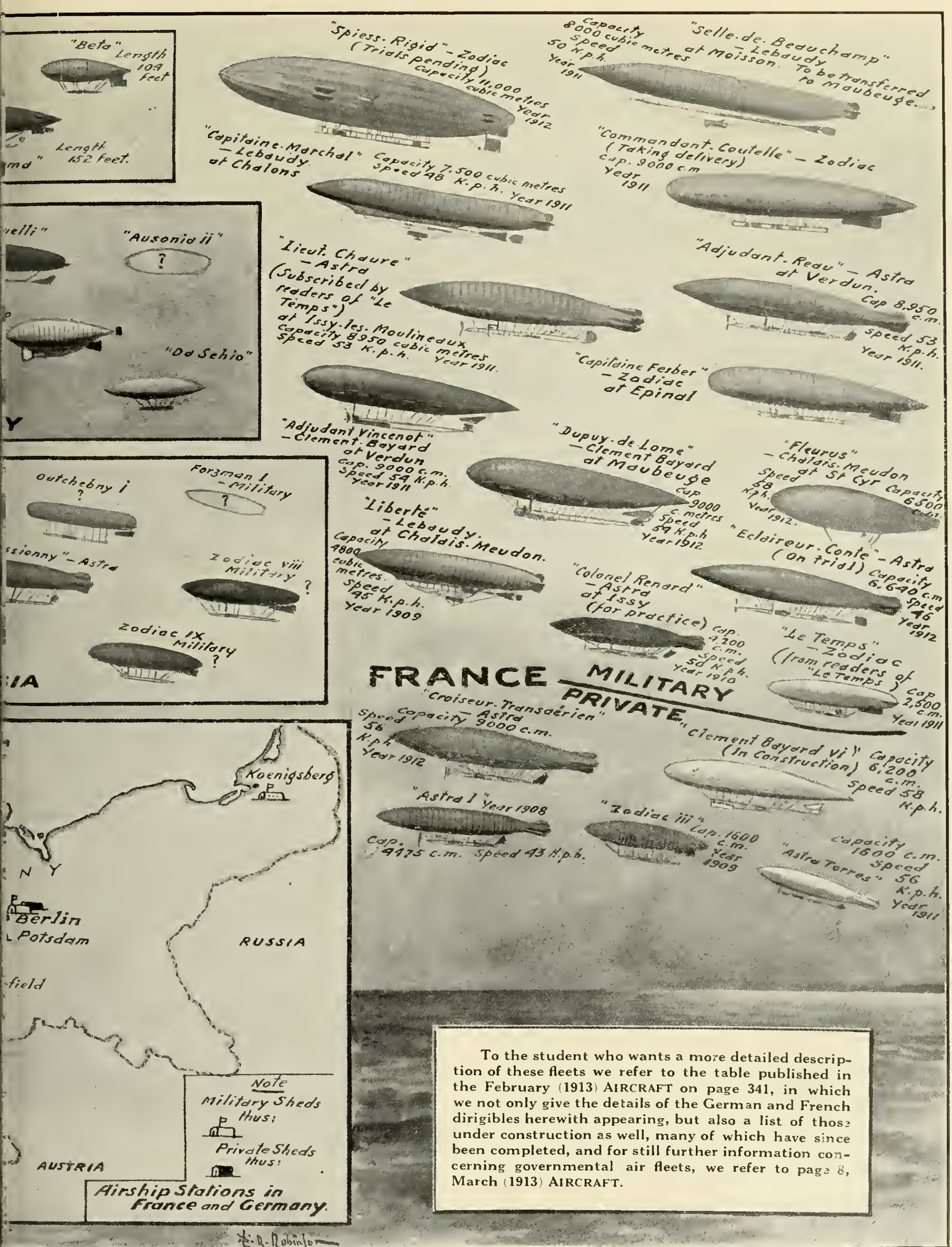
Italy is said to be building an aerial Dreadnought, the largest dirigible yet constructed. Its capacity is to be 25,000 cubic metres, with two motors capable of developing 1,000 h. p. and attaining a speed of 100 kilometres per hour. The vessel is to be heavily armed with aerial torpedoes and guns.

It is also said that Italy intends to increase its fleet to twenty dirigibles within the next year, several of which are to be of the Dreadnought type. The war in Tripoli has taught the Italian military heads that dirigibles capable of manoeuvering over an enemy's position and out of range of his guns, are very desirable vehicles to possess.



To the struggle for the control of land and water has now been added a struggle for the control of the air; hence not only much energy devoted to the construction of aeroplanes and dirigible balloons for military purposes, but the provision of such an Act as that just framed by the British Government forbidding air craft passing over certain territory under penalty of being shot at (shot AT, understand), proves that the different governments are now taking a most serious view of the subject.

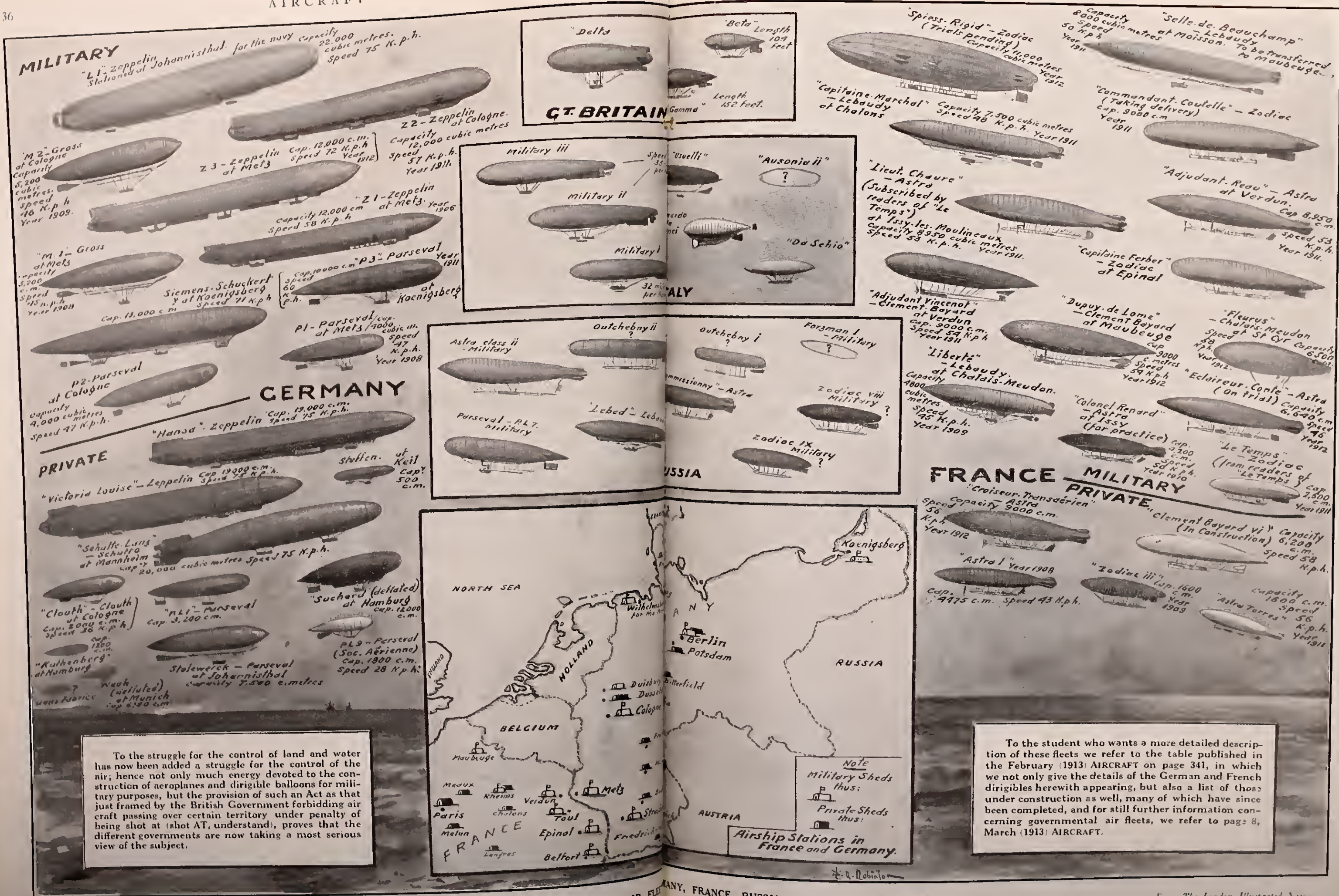
PICTORIAL REVIEW OF THE LIGHTER-THAN-AIR FLEET



To the student who wants a more detailed description of these fleets we refer to the table published in the February (1913) AIRCRAFT on page 341, in which we not only give the details of the German and French dirigibles herewith appearing, but also a list of those under construction as well, many of which have since been completed, and for still further information concerning governmental air fleets, we refer to page 8, March (1913) AIRCRAFT.

…, FRANCE, RUSSIA, ITALY AND GREAT BRITAIN

From The London Illustrated News



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PICTORIAL REVIEW OF THE LIGHTER-THAN-AIR FLEETS OF GERMANY, FRANCE, RUSSIA, ITALY AND GREAT BRITAIN

From The London Illustrated News

EDITORIAL

WHAT GOOD IS IT ?

WHAT good is it? is the head-liner of a two-page inquiry in the March number of "Popular Mechanics," and as it relates to the aeroplane, and as the nameless inquirer who styles himself "A licensed air pilot" made some erroneous statements and brought out some arguments usually produced by near-sighted and prejudiced skeptics who have not given the thoughtful consideration to the subject it deserves, we herewith dissect it for the good of our own readers:

> "Robert Fulton stepped ashore amid the plaudits of the crowd. The trial trip of the "Clermont" had been successful, and he was receiving congratulations from all sides. Suddenly he noticed his friend the Immortal Skeptic approaching, and after the conventional greetings were said, Fulton asked:
>
> "Now, then, what do you think of that."
>
> The old gentleman shook his head sadly. "Well, Bob, your boat runs all right, but what good is it?"
>
> Some time afterward the Immortal Skeptic, who had been traveling on the Continent, happened to be present at the first public trial of Stephenson's locomotive. He watched the little engine cough its way over a short stretch of planking, admired the ingenuity displayed in its design, but again his verdict was—"What good is it?"
>
> Years passed, and the Immortal Skeptic was kept pretty busy with the telegraph, the cotton gin and the bicycle, until one day he came upon Mr. Selden, who was industriously tinkering with his "horseless carriage." At last the little car started, but the Skeptic, who strolled along beside it, muttered: "How can people waste their time so? Now, what possible good is this?"

As far as L. A. P. (Licensed Air Pilot) has gone, it is plain to be seen that he was looking backward with excellent judgment, and as it does not require very much imagination to understand that the steamboat, railroad and the automobile have become great factors in human progress, he shows splendid rear-sightedness.

It will be noticed that he pokes fun at the Immortal Skeptic who asked identically the same questions about the steamboat, railroad and automobile which he now asks concerning the aeroplane. It is questionable, however, whether he has sufficient imagination to realize that he has put himself in the Immortal Skeptic class with the others. This will be shown by his next paragraph, which says:

> "Only a short time afterward the Immortal One—people had begun to call him "the Knocker"—was in North Carolina, where he saw the Wright brothers' aeroplane make its first successful flight. He was impressed, but when asked for his opinion, all he said was: "Boys, you have a wonderful thing there, but what good is it?" And here, for the first time in all his long and varied experience, he found men who realized the limited possibilities of their invention. For what good is the aeroplane? With the possible exception of employing it in war, it is no good: there is nothing that an aeroplane can do that cannot be done surer, safer, and as fast, by some other vehicle. This was true when the Wrights first got off the ground, and it is true to-day."

We take exception to the remark in that paragraph which states there is nothing that an aeroplane can do that cannot be done surer, safer and as fast by some other vehicle, for notwithstanding that the aeroplane is still in an embryo state, it can do things to-day that no other vehicle can accomplish. For instance, on February 25, 1913, Marcel G. A. Brindejonc-de-Moulinais, a French aviator 21 years old, flew from Paris to London in 3½ hours, exclusive of two stops en route. That trip could not have been made by any other vehicle except an air craft. By any other means of transportation he would have required two distinct types of machines—one for over land and one for over water travel, making at least two changes necessary, with its consequent loss of time, so that in this instance the aeroplane did the work of the land and water vehicles combined, neither of which could have done the work alone. Thus with a fact we show the inaccuracy of his statement.

Now, regarding his statement "there is nothing that an aeroplane can do that cannot be done surer, safer and as fast by some other vehicle," the fact given also disproves him again, for the reason that by arriving in London de Moulinais proved it could not have been done either surer or safer, for nothing happened to him en route. Regarding the speed, an aeroplane can convey one from Paris to London in a great deal less time than one can be conveyed by any other means of transportation between those two points. So in speed, as far as useful transportation is concerned,

there is no vehicle which can compete with the aeroplane. For instance, an aeroplane can make a speed of more than 105 miles an hour in an air line across country between two points, thereby making it a useful conveyance. There is no automobile made to-day that can make the same speed across country, for it must be remembered that all the greatest speeds made in automobile races are run over specially prepared tracks and cannot be made if run over the roads between different cities, say, New York and Albany, a distance of 150 miles, whereas a flying machine's pathway being in the air there is nothing to prevent a straight run at its highest speed.

What good is it? is his question. What good is any vehicle but to transport either passengers or freight from point to point? Brindejonc-de-Moulinais wanted to go from Paris to London. He took an aeroplane and went there. He could have done no more than to have gotten there if he had gone in any other way. What good is the automobile, you might ask? Simply to transport one from one point to another, just exactly as the aeroplane did for Brindejonc-de-Moulinais. It could do no more. You might ask what good is the motorboat, with as much logic, for it can do no more than act as a conveyance from place to place.

What good is it? On January 25, Jean Bielovuccic, the Peruvian aviator, flew across the Swiss Alps from Brig, in the canton of Valais, to Domodossola, Italy, in less than half an hour.

What good is it? On the night of February 6th, Aviator Mutuasis, a Greek pilot, flew over the Dardenelles in a hydro-aeroplane, traveling 180 kilometres, and brought back information to the Greek Admiral concerning the position and strength of the Turkish fleet, as well as information concerning the different forts over which he traveled. The Greek Admiral could have gotten this information in no other way at that time. That is the good of it, and we could tell of hundreds of other trips made that were not only useful but impossible of performance by any other vehicle.

> "For the aeroplane has not made the rapid strides that were expected in the early days, and it is no nearer being a commercial vehicle to-day than it was nine years ago. It is my good fortune to have piloted machines that are the very last word in French design and construction, yet, aside from the finish, they are absolutely no improvement over the old birds that made records and widows at the first Rheims meet. That the French machines are superior to their contemporaries is shown by their recent performances at Chicago. yet, on them, the vital problem of stability is as far from solution as ever. They take weeks to master, and they are very, very far from being commercially fool-proof. A loose bolt here, a wire jammed there, a puff of wind when flying low—and another airman has gone, just as they have been going for years."

First, let us state that there were no widows made at the first Rheims meet, which shows that "L. A. P." makes statements without knowing the facts. No aviator was killed at the Rheims meet in 1909, although at about the same time there was an automobile meet held at Indianapolis in which several men were killed through automobile accidents.

Furthermore, the statement that there are no improvements in aeroplanes to-day over the old birds of 1909 is positively ridiculous. The same statement might be made concerning the motorboat or the automobile with equal logic.

What is improvement in vehicles? Is it not better construction and their ability to do better work? And what is better work in a vehicle but greater speed and duration. Does not the aeroplane records show improvements in these lines?

At the Chicago Gordon-Bennett 1912 race, Vedrines made about 105 miles an hour, whereas at the Rheims meet in 1909 a speed record was made by Curtiss of 47 miles an hour, so that from 1909 to 1912—a period of three years—there was an increase in speed from 47 to 105 miles per hour. Is not that improvement? Height records went from a few feet above the ground to nearly three and one-half miles. Duration records went from one hour or so to 13 hours. The cross-country flights jumped from 10 or 15 miles to 450 miles. This marvellous advancement in speed, height, duration and cross-country flying could not have been accomplished without better constructed and therefore greatly improved machines.

In regard to stability, the aeroplane to-day is more efficient than ever. René Quinton, head of the Ligue Nationale Aerienne, in an address recently before the aviation heads of France, stated that there is no longer any question of automatic stability—that it is already here and has been successfully demonstrated in the Moreau monoplane in which Moreau, accompanied by a passenger, flew his machine before an official military committee with both hands across his breast throughout his various trips and that he even went so far as to land the machine without taking the controls. Fokker has achieved about the same result in his latest aeroplane.

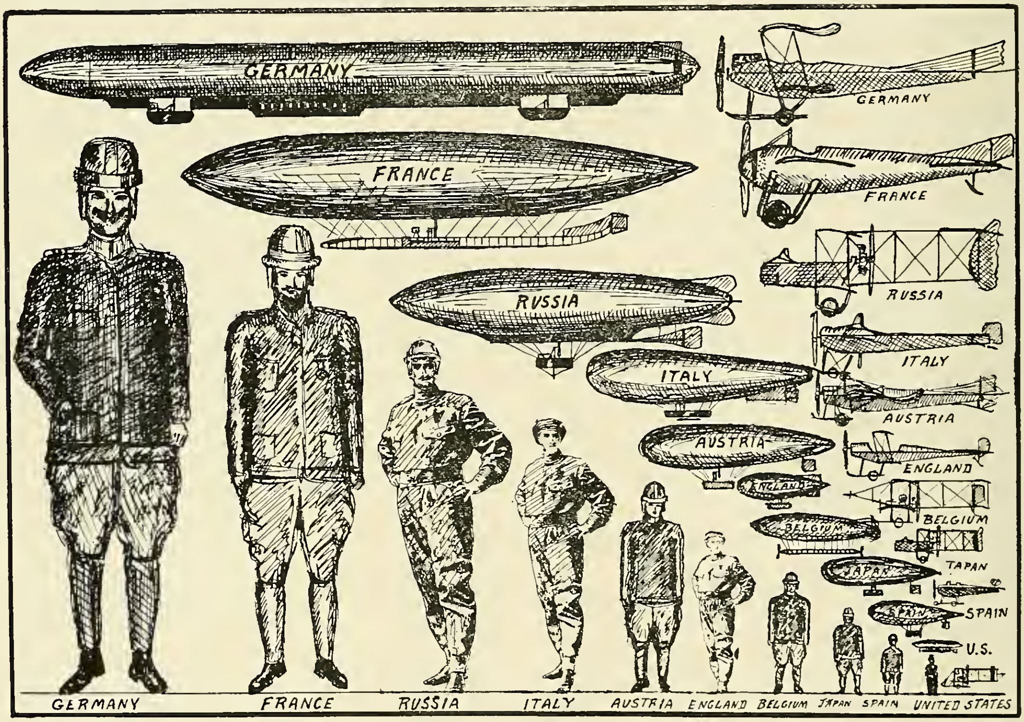
The fact that some aviators lose their lives while flying proves no more against the efficiency of aeroplanes than a chauffeur losing his life proves against the efficiency of automobiles, or seamen losing their lives proves against the efficiency of steamships, or railroad men being killed proves anything against the efficiency of railroads; so that loss of life cannot be put forth as an argument against flying any more than it can be put forth against all other means of travel. Even the old-time horse was the cause of loss of life to mankind, and in fact there always was and probably always will be loss of life connected with transportation methods of any kind whatsoever.

"L. A. P." spent a lot of time explaining why the aeroplane will not carry heavy weights, such as a large number of passengers and freight. Suppose that his contention eventually turns out to be correct. What of it? The aeroplane as it stands to-day can

carry as many passengers as the average automobile, can it not? Therefore, if it never evolves into a great weight carrying machine, it will at least be as useful as the automobile and the small motorboat, will it not? In fact more useful if it can do the same work that it takes an automobile and a motorboat together to accomplish. Therefore, taking it as it stands to-day "the good of it" is demonstrated equal in efficiency to the automobile and motorboat combined, as was proved by de Moulinais flying from Paris to London over land and water without changing his conveyance, besides cutting the regular time required for the trip nearly in one-half.

Besides not sticking to the facts "L. A. P." lacked imagination, just as did the Immortal Skeptic who preceded him during the days of Fulton and Stephenson and whom he so facetiously introduced in the beginning of the article. Those early skeptics allowed nothing for evolution to work out in steamboats or railroads, and our modern Immortal Skeptic allows nothing for evolution to work out in the aeroplane. But it is, we presume, by creating men without imagination or insight into future possibilities that Nature balances progress and thus holds in check those it chooses to lead the procession by making them literally pull forward or carry upon their backs the great mass of inert humanity.

The Immortal Skeptic who wrote that article under the nom de plume of "A Licensed Air Pilot" not only belongs to the aforesaid mass, but lacks even the capability of setting forth the facts as they exist to-day. By giving attention to him we merely answer the millions of other Immortal Skeptics to whose school he belongs and from which he will never graduate.



Governmental Expenditures for Aeronautical Work During Five Years.									
$28,000,000	$22,000,000	$12,000,000	$8,000,000	$5,000,000	$3,000,000	$2,000,000	$1,500,000	$550,000	$435,000
Approximate Number of Aeroplanes Either Owned or Ordered.									
500	500	350	250	200	150	125	100	30	28
Number of Dirigibles Either Owned or Ordered.									
30	25	18	12	8	7	3	5	2	1

MR. U. S. CONGRESSMAN, MR. U. S. NEWSPAPER EDITOR and MR. U. S. PLAIN CITIZEN, we present above in picture form the relative size of Uncle Sam and some of his competitors in aerial progress.

You know we all like to feel that Uncle Sam is a mighty big fellow, and we spend a great deal of energy sometimes trying to convince our neighbors as well as ourselves what a wonderful giant he is in everything pertaining to progress. We like people to believe that Uncle Sam leads the world in everything and we feel very much offended if our listeners laugh real loud when we proudly tell of his mammoth proportions, and then we get madder than a headless chicken if, after all of our conversational efforts, a foreigner pulls out of his tobacco pouch some very hard facts in the shape of statistics, together with a microscope, and begins to take the exact measure of U. S. Great Suffragette! but doesn't it make us mad? Unfortunately, neither talk nor getting mad increases size or he would soon be a swaggering giant sure enough.

Now, why not get over into a corner somewhere by ourselves, and consider the facts as they are, and then openly acknowledge to the world that we are but microbes by comparison with other countries in aeronautical progress, but make an emphatic resolution that from now on we will begin to grow in a manner that will astonish the big fellows who lead us? This can be accomplished by giving Uncle Sam a little much-needed nourishment in the shape of governmental appropriations, good newspaper treatment and capitalistic backing.

Lieut. Calderara's "hydrovol." An interesting Italian machine.

FOREIGN NEWS

BY

Arthur V. Prescott

Austria

The Ministry of War has placed orders with a Hungarian firm for fifteen aeroplanes.

Orders have also been placed for fifty monoplanes from various other establishments.

Belgium

BRINDEJONC DE MOULINAIS FLIES FROM LONDON TO BRUSSELS AND THEN BACK TO PARIS.

Bindejonc de Moulinais, the young French aviator, who made such a remarkable flight from Paris to London on February 25th, left the Hendon Aerodrome, London, on the morning of the 27th and flew across the English Channel to Calais, where he stopped for the night, continuing on the next morning to Brussels, Belgium, where he remained for a few hours and then headed for Paris, which he reached on the same day, after making one stop at Compiegne. The total distance covered was about 1,050 kilometres.

Bulgaria

The Prince George Bibesco has ordered six Blériot monoplanes (80-h. p. Gnome engines) of the tandem two-seated type. Three machines of this type, but with engines of 70-h. p., are at present in use in the Bulgarian army.

Denmark

Prince Axel of Denmark, Lieutenant in the Danish Navy, cousin of two emperors and a king, has taken his pilot's certificate with distinction.

Lieutenant Aviator Birch of the army has offered to accompany M. Amundsen on his intended expedition to the North Pole.

England

The Home Office, on March 6th, issued an elaborate set of regulations setting out the areas in which foreign airmen may not land, and imposing severe restrictions and penalties. Any foreign airmen breaking the regulations are liable to six months' imprisonment or a fine of $1,000 or both. Any foreign airmen found guilty of espionage are liable to seven years' penal servitude.

All foreign aircraft coming to the United Kingdom are required first to obtain clearance papers from the British Consuls. Landings will be restricted to certain areas of the coast, where the air pilots must report to the authorities and obtain a permit for the continuance of the voyage. They are prohibited from passing over certain districts in which are included the military and naval stations.

Any one infringing the regulations, it is announced, is liable to be fired on.

Gustav Hamel, the noted English Blériot pilot, is having a special Blériot racer built with which he hopes to win this year's Gordon Bennett Aviation Trophy. The racer is to be equipped with a 160 H. P. Gnome and capable of attaining a speed of 120 miles an hour.

HYDRO-AEROPLANE CONTEST

The Royal Aero Club has issued rules for a hydro-aeroplane competition for a $2,500 prize offered by Mr. Mortimer Singer. The machine must be all British. The prize will be awarded to the first machine carrying a pilot and a passenger which makes six out and home flights of five miles, starting from land, attaining a height of 1,500 feet and alighting on the water, rising from the water and coming back to land.

It is announced that the English government has ordered four new dirigibles of the Delta type to be immediately constructed at the Royal Aircraft Factory. These new dirigibles will be larger than the present Delta type and will be fitted with machine guns and capable of carrying ten passengers instead of six.

France

FAVORABLE DECISION FOR THE WRIGHTS.

On March 12, in the Fourth Division of the Court of Appeal, the Wright Aeroplane Patents were upheld by a favorable decision confirming a previous judgment rendered in the Third Division after receiving reports from a technical commission. The hearing and arguments lasted seven days.

RECORDS.

M. Pierre Gougenheim, not content with having broken the height record with four passengers, has now broken it again. Accompanied by four friends—pupils of the Farman School—he left ground at Etampes on a Henry Farman biplane on February 10th, at 3.40 P. M. At 4.48 P. M. he had reach a height of 1,120 metres (3,674 feet). He then stopped his motor and descended in a spiral glide.

Hearing that Gougenheim was about to make the above attempt, M. Guillaux, accompanied by M. Max Bruyère, left Issy les Moulineaux on a Clement Bayard monoplane early in the afternoon. The journey to Etampes took exactly thirty minutes.

Records are appearing like the flowers in spring. First Gougenheim and now M. Maurice Guillaux have altered the figures of stated feats. On February 11th, at Etampes, M. Guillaux, with M. Max Bruyère as passenger, on a Clement Bayard monoplane, started to fly at noon and finished at 4.06 P. M. He has thus broken all records of speed and duration of flight with a passenger. The following are the new figures

	h.	m.	s.
100 kilometres in.........	1	2	10
200 " "	2	4	27
250 " "	2	34	48
300 " "	3	4	5
350 " "	3	34	46
400 " "	4	4	4
410 " "	4	10	46

And

Two hours................	191 kil. 900.
Three hours..............	291 kil. 900.
Four hours...............	391 kil. 900.

NEW TYPE DEPERDUSSIN MONOPLANE ACCEPTED

Captains Destouches and Cammerman recently officially accepted a new type single-seater 50 H. P. Rhone engined Deperdussin monoplane in which the pilot sits well forward and has an extended range of vision.

Lieut. Kreyder, of the aviation centre at Camp d'Avor, on February 11th flew from that place to Saint-Benin-d'Azy (Nievre) in order to lunch with a friend. Later he returned to his base, having flown the 200 kilometres out and back without any trouble.

FRANCE TO HAVE AIR BOAT SERVICE.

The Societe Trans-Aerienne have arranged to station three or four hydro-aeroplanes at Cannes for the purpose of carrying passengers to Nice. The machines, one of which has already been delivered, are Astra hydro-aeroplanes of the three-passenger type which won the St. Malo meet.

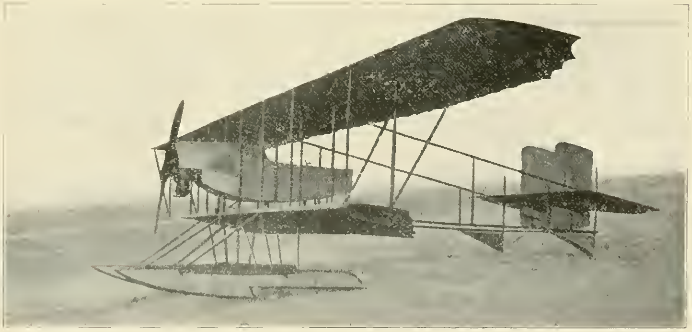
On February 11th, at Etampes, in the presence of Captain Destouches, MM. Espanet and Gobé flew four 100 H. P. Gnome engined Nieuport monoplanes through the official acceptance tests for the French army. Espanet on one of them with 7cwt. 97 pounds useful load, rose to a height of 1,600 feet in three minutes.

The same day Captain Aviator Saint Quentin and Lieutenant Aviator Sallier passed, on Maurice Farman biplanes, their tests for the superior military brevet. The former flew over the circuit Buc-Chateaurenault-Buc, and the latter Buc-Camp de Mailly-Buc. M. Lemaitre, on a Henry Farman biplane, passed the first test for the military brevet by an hour's flight at 2,500 feet at Etampes. Sergeant Chatelain, on a Henry Farman biplane, passed his last test by a flight over the circuit Etampes-Camp de Mailly-Camp de Sissonne, Camp de Chalons.

PERREYON ESTABLISHES NEW WORLD'S ALTITUDE RECORD OF 19,650 FEET

A new world's altitude record of 19,650 feet was established at Buc on March 11th by Perreyon, the chief pilot of the Blériot School. The previous record was held by Raland G. Garros, who reached an altitude of 19,032 feet at Tunis, Africa, on December 11th, 1912.

On a Clement-Bayard monoplane Guillaux flew, on March 4th, from Savigny-sur-Braye to Paris, a distance of 118 miles, in exactly one hour.



The latest Caudron hydro-aeroplane with the wheels built into the floats. Note how the tail outriggers now run direct to the planes and the similarity of the whole as compared with the suggested tractor design run in the March issue of AIRCRAFT. A number of these machines have been ordered by the Chinese government.

FLIES FROM PARIS TO LONDON AT RATE OF MILE AND A HALF A MINUTE

Marcel G. A. Brindejonc de Moulinais, a French aviator, who is only twenty-one years old, flew from Paris to London on February 26th in three and one-half hours with two stops.

This new and notable record was made on a Morane-Saulnier monoplane. The aviator started at 5.15 in the morning from Paris, landed at Calais at 10.15, resumed his flight at noon and descended in London at 1.30, after crossing the channel in a fog.

The distance between Paris and London is 287 miles, so that during his actual flying time of 185 minutes the French airman flew at more than a mile and a half a minute.

Germany

During the luncheon following the betrothal of H. R. H. the Princess Victoria-Louise of Prussia to H. R. H. the Prince Ernest Augustus of Cumberland, Duke of Brunswick-Luneberg, etc., the military dirigible Z.-3 flew above the Chateau at Carlsruhe.

An accident not dissimilar to that which befell the German naval Albatross biplane at Putzig, but happily without any fatal results, occurred near Berlin last week, when Naval Lieutenant Bertram and the Austrian pilot Sablatnig fell into the Havel. Sablatnig was testing a new A.E.G. biplane bought by the War Office and had Lieutenant Bertram, himself a well-known aviator, as a passenger. The machine flew down the Havel river, which forms a number of large lakes in its course, and was just crossing Heiligensee at an altitude of 560 metres when a main stay gave way and forced Sablatnig to a rapid descent. The machine commenced to overbalance, and to right it Lieutenant Bertram accomplished the daring deed of climbing on to the right wing, where he stayed during the horribly swift journey downwards. Sablatnig headed for the water in a glide without the motor working; then, in passing over a cluster of buildings, he restarted the engine and managed to alight in a stretch of open water. Bertram was thrown off the aeroplane head first into the river, and Sablatnig dived to save his stunned passenger from drowning. Both men were rescued and taken home in motor cars, their injuries being comparatively slight.

The route of the Prince Henry Circuit, 1913, known previously as Upper-Rhenian Circuit, has now been fixed definitely. The event commences on May 10th at Wiesbaden with the taking off of all the aeroplanes not owned by the army. On May 11th the start is made for Cassel with an intermediary landing at Giessen, 165 kilometres in all; May 12th, Cassel-Coblenz, 170 kilometres; May 13th, rest day at Coblenz; May 14th, Coblenz-Karlsruhe, 200 kilometres; May 15th, rest day at Karlsruhe; May 16th, Karlsruhe-Strassburg; May 17th, Strassburg-Freiburg-Strassburg. Scouting manœuvres are to be held on the two last days. All the aeroplanes must be of German make, but no restrictions are made as to the engines. The German Emperor and his brother, Prince Henry, have both offered handsome trophies for the contest, which will be carried out on purely military lines.

Prince Siegismund, of Prussia, a nephew of the German Emperor, who is an enthusiastic designer and constructor, has engaged Krieger to pilot the monoplane built by the Prince last year at his workshops. At present H. R. H. is engaged on a racing machine which is to take part in all the big events with Krieger at the helm, and will be fitted with a 100 H. P. Mercédès motor.

A hydroplane week is to take place in Germany from July 8th to 13th, Lake Constance having been chosen as the most suitable spot. The chief event will be the Lake Constance Grand Prize, with 70,000 marks in prizes for a speed and reliability test of 200 kilometres, about 160 miles.

Faller of Mulhouse has added a fifth world's record to those gained by him already, as he flew for 1 hour 10 minutes 17 seconds on February 9th, with five passengers, thereby beating Molla's performance by a margin of four minutes. Of the six world's records in aviation against German names Faller holds the lion's share.

THE GERMAN WRIGHT SUIT

On February 26th judgment was given out in the Supreme Court at Leipzig sustaining the Wright patents in Germany. A cablegram sent from Leipzig by Orville Wright states as follows; "Decision favorable. Grants protection for warping wings in connection with rudder. Claim for warping alone, not allowed owing to the warping wings of the Wright machine having already been disclosed by myself and Octave Chanute in publications prior to application for patent."

The German patent office in Berlin by its decision grants the protection for warping the wings in connection with the rudder, but as the majority of the German machines do not use the rudder mechanically interconnected with the warping or side-balancing this decision does not affect them and is really favorable to them.

German Notes

By Stella Bloch.

The new military cruiser "L. Z. 16" will be given the number "Z IV" as soon as the German War Office takes over this Zeppelin. "Reserve No. I," which is stationed at Baden-Oos, is making daily trips through Wurtemberg, Baden and Alsace, greeted everywhere by intense enthusiasm. It is a most perfect vessel, capable of carrying a crew of twenty-six persons. "Z IV" will go up to Hamburg after its trial spins.

Lieutenant Mackenthun, one of the most prominent of German aviators, is about to leave the army to accept a position as technical head of the new aeroplane works of the Allgemiene Elektrizitats-Gesellschaft are about to put up.

Our readers will be interested to learn that Fraulein Melli Beese, whose photograph appeared in the January issue, has been married to M. Charles Boutard, technical director of the Beese Aviation Works.

The much debated "four nations' flight" to comprise Germany, Denmark, Sweden and Norway, to be held in June, will not take place, as Sweden has taken up an attitude not reconcilable to that of the other competing countries.

The well-known pilot, Josef Suvelak, of the Essen Condor Aviation Works, achieved a fine accomplishment on February 23d, when he flew to Holland and back. His original intention was to fly to London, and as his compass was not in proper working condition his landing at the Zuder-Zee was effected mainly to right the compass. He was then, however, informed that the Channel was covered by a dense fog and warned against flying on further.

Suvelak, who left Essen at 9.30 A. M., returned at ten minutes to 6 the same evening. He intends carrying out his original trip in May, when the air is clear and circumstances more favorable for his reaching the British metropolis.

Greece

M. Guinard, the French aviator, who has recently been piloting the Astra hydro-biplane for the Greek navy, has now returned to Paris. He states that during his time in Greece he made several reconnaisances over the Aegean Sea. On one occasion, while flying with a Greek officer as passenger, his engine stopped and forced him to alight on the water. A heavy sea was running and the back float was broken away almost immediately after touching. He and his passenger had to remain on the aeroplane, with its tail under water, for two hours before being rescued.

Italy

On February 10th, at Spezia, M. Paulhan, in the presence of many naval officers, flew a Paulhan-Curtiss hydro-biplane through all the tests imposed by the navy. Delivery was made later in the day.

ITALY TO HAVE MAMMOTH AIR FLEET.

Italy is making strenuous exertions to bring its aerial fleet up to a pitch meeting all requirements, and trusts to have twenty dirigibles and 250 aeroplanes before the year is out. Of the twenty cruisers ten will be apportioned to the navy, being divided into five of a capacity of 24,000 and five of 12,000 cubic metres, whilst the ten for army work are to be of 4,000 and 12,000 cubic metres only. A thorough reconstruction of the present aerial system is being considered, as each army corps is to have an aeroplane detachment of ten machines, and aviation stations with twelve machines each are to be erected in all the frontier garrisons. The African corps will also be equipped with several aeroplanes.

FLY FROM FRANCE TO ITALY IN HYDRO-AEROPLANE

The first hydro-aeroplane tour by two persons between two countries was made on March 4th, when Messrs. Laurens and Schneider flew from Beaulieu-sur-Mer to Genoa on a Deperdussin monoplane.

The time—one hour and fifty-two minutes—is very close to that made by Garros in the Paris-Rome race, which was one hour and forty-seven minutes. The aviators started at a quarter to 9 o'clock and arrived at Genoa after 6, having made a long stop at Spotorno.

FLEET FOR ITALIAN ARMY.

The newly formed Italian Trans-Aerial Society has undertaken to build a large number of aeroplanes for the Italian army. With the $600,000 subscribed during the Libyan war for aeroplane construction this will provide about two hundred aeroplanes. The first flotilla of seven aeroplanes was delivered to the government on March 15. Seven monoplanes and sixteen biplanes are to be delivered in April.

Morocco

Lieutenant Magnien of the Oujdia aviation centre in Morocco on February 10th flew from Oujdja to Taouriert on a 50 H. P. Deperdussin, covering the distance of 200 kilometres in two hours and a half.

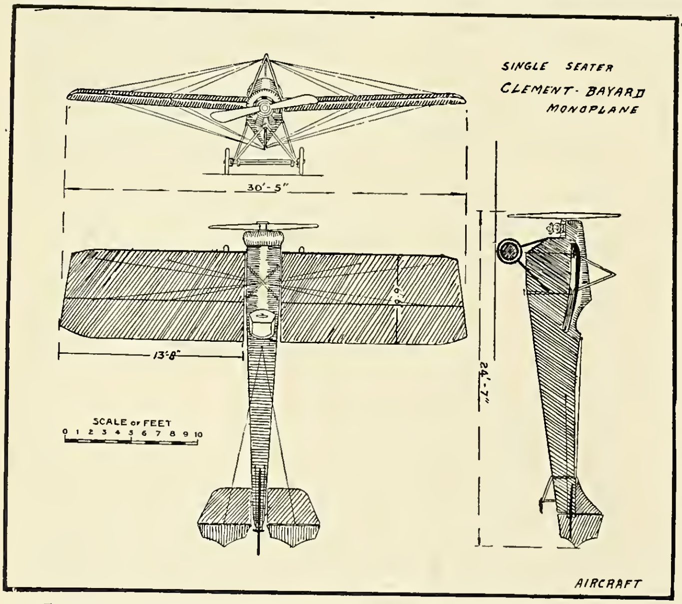
Russia

At Juvisy, France, on February 10th, M. Rebikoff and Captain Andreadi observed the reception tests and accepted a Brageas monoplane for the Russian army.

Servia

M. Jules Vedrines on February 9th made several flights at Nisch on an 80 H. P. Deperdussin monoplane, taking in turn several officers of high rank as passengers.

M. Godefroy on the same day put two Deperdussin monoplanes through reception tests at Nisch for the Servian army.



Front, top and side view drawings of the single seater, steel frame Clement-Bayard monoplane. This machine is especially interesting as it is one of the few really successful all steel aeroplanes.

The two-passenger Clement-Bayard monoplane holds the world's records for aviator and passenger for distances of 100 to 400 kilometres and the greatest number of miles covered over a closed circuit in four hours, i. e., 392 kilometres.

THE SOPWITH AIRBOAT

By WALTER H. PHIPPS

The new Sopwith flying boat constructed by T. O. M. Sopwith, the well-known English aviator, is one of the most interesting developments in the aeroplane line to-day, as it sets a new standard in air-water craft

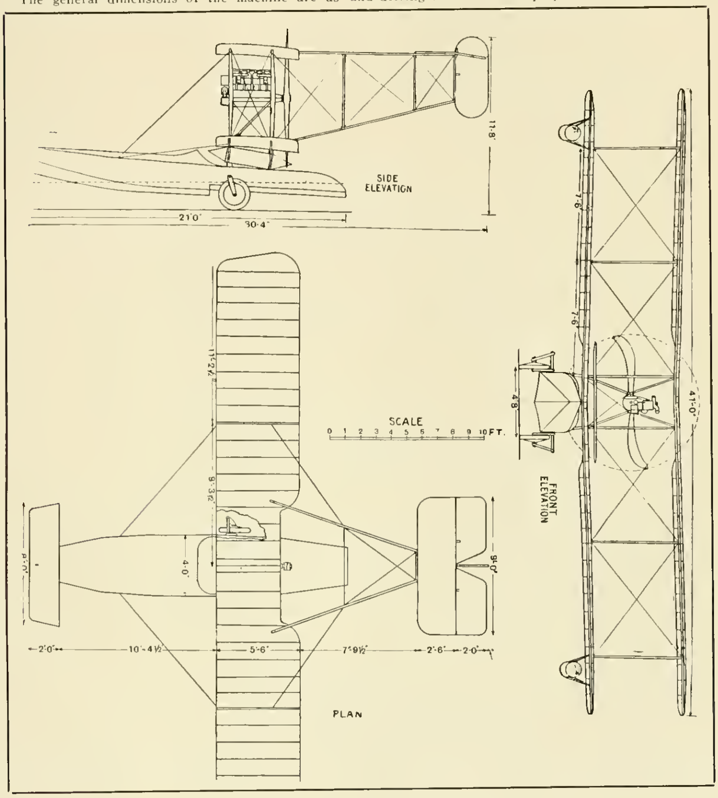
It was the aim in designing this water plane to evolve a machine for water flying which would combine in one craft the best qualities of the flying boat and aeroplane in such a manner that the machine would be equally as successful when operating either on the water or in the air. For this reason, as can be noticed in the accompanying drawings, the new Sopwith machine is really a medium between the ordinary central pontoon hydro-aeroplane and the long, narrow boat type of the Donnet-Leveque and the Curtiss order. By making the single central pontoon boat considerably longer and wider than the usual Curtiss type pontoon and placing the seats for the operator and passenger within the hull, Sopwith has devised a seaworthy airboat having a very long freeboard in front to ride the waves, while at the same time since this hull does not extend way back to the tail it therefore eliminates the chief drawback of the usual flying boat type, viz., the drag of the after-part of the boat in the water. In addition, the Sopwith boat pontoon is so designed that as soon as the speed of the aeroplane accelerates, the nose of the pontoon rises out of the water and automatically gives the machine the proper angle to rise from the water. In addition this same nose-rising quality adds tremendously to the safety of the machine in alighting, as, even should the boat strike the water at an angle and her nose go partly under, the shape and buoyancy of the hull will bring the nose up again before the water has reached the occupants.

Another advantage of this type of flying boat is that it allows of the use of a standard tail and rudder in the rear, and thus permits (if properly balanced) of converting almost any large surface standard rear propeller biplane of the general Farman type into an efficient and seaworthy airboat without detracting from its flying qualities.

General Description.

The most interesting part of the Sopwith airboat is the hull itself, which, contrary to usual practise, uses a V-bottomed hydroplane hull, which has been modeled after the successful English hydroplane "Mapleleaf." The hull is constructed of cedar laid on in two layers. Each of these is one-eighth inch thick, the first layer being put on in a diagonal direction, the outer one being placed so that its planks cross the inner ones. Between each there is a layer of oil silk and the two are sewn together with copper wire. The structure is stiffened with four longitudinal members at each corner, while a pair of smaller planks between them help to support each side. Seating accommodation is made for two persons. The whole is constructed in such a manner that a considerable keel lies beneath the bottom surface, and this extends past the step to the rear. It is sloped upwards as it approaches the bow and is tapered laterally from that point. Two watertight compartments are fitted, each of which is capable of supporting the whole weight of the machine. The length of the hull is 21 feet, while its greatest beam is 4 feet; the total weight amounts to only 180 pounds, this being remarkably light for so large and solid a structure when it is remembered that the small Curtiss pontoon weighs in the neighborhood of 125 pounds.

The general dimensions of the machine are as follows Length, 30 ft. 4 ins.; span, 41 ft.; chord, 5 ft. 6 ins.; gap, 6 ft.; engine, 90 H. P. 4-cylinder Austrian-Daimler, situated between the two planes and driving an 8 ft. 6 ins. propeller.



Scale drawings of the new Sopwith airboat.

NEWS IN GENERAL

By D. E. BALL

Orville Wright Optimistic

Orville Wright reached New York on his return from Europe on March 17th more enthusiastic than ever over the prospects of the future possibiilties of the aeroplane. In his own words he says: "The hydro-aeroplane is the ship of the future. It is the one thing that will overcome the dangers of sea travel and make a journey across the ocean no more than a train trip to Chicago. I am going to devote all my time in the future to the development of this invention. The hydro-aeroplane that I have in mind will be able to journey over and through the roughest sea and besides will be able to travel twice as fast as the speediest steamship. It will eventually be able to travel on land, water or in the air according to the desire of the operator. There is, to my mind, no limit to its development; it is the vehicle of the future."

Accompanying Mr. Wright was his sister, Katherine Wright, who was just as enthusiastic as her famous brother. They both look forward to America forging ahead in the aeroplane industry from now on, notwithstanding the tremendous lead the various countries of Euorpe have over us at the present time. "Once the American wakes up to a realization of the great commercial possibilities of the aeroplane," said Mr. Wright, "there will be no holding him in check until he not only catches up to the foreigner but speedily passes him in the race in the world's market."

Flying Boat at New York Shows

The Curtiss Aeroplane Company made a fine showing at the recent Motor Boat Show at Madison Square Garden, New York, with their flying boat. Thousands of motor boat enthusiasts from all parts of the country had an opportunity to make a close inspection of this marvellous creation, many of whom arrived at the conclusion that a flying motor boat was a big step forward of the ordinary motor boat, so that some good seed was sown for future orders in flying boats.

We have to offer congratulations to Mr. H. C. Genung, the vice president and manager of the Curtiss Aeroplane Company, who conducted the arrangements for showing the flying boat to such good advantage at the Motor Boat Show.

The following week the Curtiss flying boat was also shown at the Sportsman's Show held at Madison Square Garden, under the management of Mr. Graham, the New York agent of the Curtiss Aeroplane Company.

The flying boat attracted by long odds the greatest number of visitors and interest at both shows.

Bissell's Little Joke

Mr. Joseph E. Bissell of Pittsburgh, Pa., says that a certain Washingtonian who is attracting considerable attention through his connection in the aeronautical movement reminds him of the British General caught by the Yankees in the War of the Revolution. Says Mr. Bissell: "The Yankees sent him back alive for fear the enemy might get a good one in his place."

Honeywell Gets Trophy

Capt. H. E. Honeywell, who won third prize in the Gordon Bennett international cup balloon race from Germany last fall, has received the trophy from the Berlin Kaiserlitz Automobile Club.

It is a handsome platter and twelve uniquely designed cups, which compose a wine set. The materials are sterling silver, with heavy gold plating, and the set is said to be one of the most novel pieces of workmanship seen in St. Louis.

A New Varnish for Aeroplane Cloth

The C. E. Conover Company of New York, manufacturers of the Naiad Aeroplane Cloth, has just put upon the market a new varnish for aeroplane cloth which thoroughly shrinks the aeroplane cloth, tightens it up and keeps it tight. This varnish also adds from twenty to one hundred per cent in strength and in addition makes the cloth waterproof and air-tight. The Naiad varnish has already been used by the Gallaudet Engineering Company, the Moisant International Aviators and the Burgess Company and Curtis, George W. Beatty and others.

Bell Ready for 1913

Frank M. Bell, the well-known aviator of St. Louis, Mo., who was trained for cross-country flying by Anthony Jannus in a Benoist machine, is now ready for 1913 exhibition contracts and expects to eclipse his 1912 record of eleven engagements and fifty-seven passenger-carrying flights. He flies a Benoist military tractor biplane.

Corpus Christi

L. H. De Remer has been doing some remarkably clever flying during the past few months, on one occasion remaining aloft with a passenger—J. C. Curran of Saginaw—for two hours and forty-one minutes in a hydro-aeroplane.

Many lady passengers have also taken long cruises into the air with him lately.

Porto Rico

A. Leo Stevens and his company of flying experts have been doing some exceptionally fine exhibition work in Porto Rico during the past month and expect to return to the States to fill summer engagements during the latter part of March.

At the Third Insular Fair held at San Juan from February 22 to March 2 Stevens's aviators and aeronauts were the biggest part of the exposition, and their work has gone a long way to popularizing air craft on these islands.

The Governor of Porto Rico highly complimented Mr. Stevens and his aviators—Harry Bingham Brown and Rodman Law—on their splendid work.

John L. Gay is deserving all sorts of credit for the excellent manner in which he conducted the entire exposition.

The New Curtiss "Six-Sixty" Motor

The Curtiss Company have just gotten out a new motor, which can be set up for either clockwise or counter-clockwise rotation so that when it is used to replace a motor of less power in a plane otherwise complete no special arrangements need be made to accommodate a possible difference of rotation.

This new six-cylinder motor is not designed as a mere stop-gap, or filler-in, between the 4-cylinder 40 h. p. Curtiss motor and the 8-cylinder V-type 80 h. p. motor, but is designed particularly to meet the demand for a motor of fairly high power with an unusually wide range of effective speeds. Where the Curtiss 40 h. p. and 80 h. p. motors are designed to operate normally, on the ground, at approximately 1,100 r. p. m., the new "Six-Sixty" will run all day at 1,350 to 1,600 r. p. m.

The double advantage of this speed range is obvious to those who have felt the need of it; this speed, when used with large, geared down tractors or propellers, make it an ideal plant for weight-lifting machines using twin screws or for light racing machines.

Especially is it well adapted for use in the lighter, speedier types of flying boats, which seem destined for immediate and widespread popularity. The Curtiss "Six-Sixty" offers ample power for the flying boat carrying two passengers and designed for sporting purposes. In such a craft it should easily develop a speed of 50 m. p. h. on the water and 60 m. p. h. or more in the air.

The manufacturers state that in a test of several hours' duration recently made at the factory the motor devoloped its rated sixty horse power at 1,100 r. p. m., and maintained this steadily for about an hour, when the speed was increased to about 1,325 r. p. m., when the motor maintained a good 70 h. p., which, though by no means its maximum, is the speed at which the motor is designed to do its best and most economical work. As a consumer of gasoline the motor, with its six cylinders and bore and stroke of 4x5 inches, proved very economical, and one filling of the tank in the base provided ample oil for lubrication on a run of six hours.

While in the principal features of its design the new "Six-Sixty" motor is very similar to the famous Model O Curtiss 8-cylinder V-type motor, at the same time there has been a vast deal of "cut and try" in the course of its development and perfection for the market, and in some minor details changes have been made that are important in final results attained.

Exhaust and inlet valves, for instance, are, as in the 8-cylinder Curtiss motor, on opposite sides of the head, but instead of working on a single rocker arm, there are desired combination of timing adjustments; so there need be absolutely no interval between the closing of one valve and the opening of the other.

Lubrication is by means of a combination splash and force feed system. The oil pump, gear driven, is submerged in oil at the bottom of the crank case, and forces oil through the hollow cam-shaft to outlets opposite each of the connecting rod bearings, cooling and lubricating them at the same time. Pistons are lubricated by the splash from the rods.

Finely ground hollow crank shafts, and the same effective pistons, with three rings and many oil grooves, are used as in the 8-cylinder Curtiss motors. A single gear and shaft with universal joint operates the pump and dual magneto.

Another improvement is the safety starting crank and bracket with which each motor is provided. With it the matter of one-man control is simple, for any flying-boat or aeroplane can be started from the operator's seat without possibility of damage from back firing.

Mufiled exhausts are made easily possible through a slight change in the cylinder design, which permits the attachment of exhaust manifold or of a light independent muffler for each cylinder. Its principal dimensions are: Length, 40 in.; heighth, 20 in.; depth below bed rails, 9½ in.

A detailed description of the new "Six-Sixty" will be found in the catalog of Curtiss motors, which may be had on application to the Curtiss Motor Company, Hammondsport, N. Y.

Bath, N. Y.

At the Thomas School there was considerable activity during the past month, and the instructors were kept busy training the large number of pupils on hand. On February 14th Frank H. Burnside and Earl Fritz of Chicago passed their license tests. Both candidates in qualifying for the altitude test rose to over 2,000 feet and showed by their skill the splendid training pupils receive at this school.

Dominguez Field, Cal.

There has been much progress at the Dominguez Field during the past month, all the schools being kept busy with instruction work. At the Schiller School the students have been out almost daily practising. John A. Riddell has completed his course at the school. Olivier has been making figure eights and shows considerable promise as a pilot. Samura and Unno have started their grass cutting practise work and should soon be making flights.

At the Sloane School things have been very lively, and Instructors Bonney, Gilpatrick and Baysdorfer have been kept hustling giving instruction to pupils, as well as making exhibition and cross-country trips in the neighboring vicinity. Allan L. Adams successfully passed his license tests on February 15th, Professor Twining acting as observer. Adams flew one of the school Deperdussins fitted with a 35 H. P. Y-Anzani. He made his figure eights in fine style. Charles C. Roystone is another pupil who has shown considerable skill and should become an adept pilot.

Miss Margaret Stahl of New York has joined the school and commenced practise work on the small Deperdussin.

In attempting a flight from Dominguez Field to San Diego Leonard Bonney met with an accident when the motor on his racing Caudron broke down and forced him to descend from a height of 3,000 feet. In trying to make a quick turn into a field he banked his machine so steeply that it lost its support and plunged to the ground from a height of 50 feet, fortunately without injuring the pilot, although considerably damaging the machine.

John Guy Kilpatrick, on March 2d, broke the American altitude record for passenger carrying aeroplanes by rising to an altitude of 5,009 feet above Los Angeles in a 60 H. P. Deperdussin monoplane, with Miss Margaret Stahl as passenger. The record is not official, as the former record of 4,660 feet was not exceeded by the 500 feet necessary to make a new record. The machine is the same in which he broke the record at Dominguez last fall, which is capable of flying 60 miles an hour, and which covered nearly 125 miles in this altitude flight. Bonney flew the machine from Dominguez to Fairfax Park, where the start was made, and after the flight he took W. A. Gibson as passenger and flew back to Dominguez.

K. Takeishi, the Curtiss graduate, has been doing considerable flying on his Day biplane, being out at every favorable opportunity and flying at a height of usually around 4,000 feet.

Griffith's Park, Cal.

Grover E. Bell has been making some splendid flights at Griffith's Park on his 60 H. P. Martin biplane. On February 16 he gave an exhibition at the grounds before a good crowd.

Hempstead Plains, N. Y.

With the coming of the nice weather there is renewed activity at the Hempstead Grounds, and both Frederick Hild and Henri St. Ives have been out practising at every favorable opportunity, while in the sheds constructors are busy getting their machines ready for active work. The Boland Aeroplane Company has opened a school at the field and the biplane exhibited at the recent Sportsman's Show is being used for school flying. Horace Kemmerle, one of Captain Baldwin's former aviators, is the Boland pilot and instructor.

Henri St. Ives is flying a 40 H. P. Caudron type biplane, which he constructed himself during the winter.

Newport Bay, Cal.

At the Martin Grounds on Newport Bay, Glenn L. Martin has been putting in a lot of fine work during the month, and in addition to instructing the numerous pupils and superintending the construction of his new 50 H. P. military tractor he has also found time to indulge in several splendid exhibition flights, as well as making some fine cross-country trips.

San Diego, Cal.

(Curtiss School.)

On February 14th Lieutenant L. E. Goodier completed the final tests for his military pilot's license by flying machine No. 1 from the military hangars at San Diego to La Jolla and return, a distance of forty miles in 37 minutes. There was a twenty-mile wind blowing at the time, and Lieutenant Goodier kept the machine at an altitude of 4,500 feet during practically the whole of the trip. On the same day Lieutenant McLeary also made some splendid flights. On the first test for his military license he glided from a height of 800 feet and landed within 27 feet of the mark. Lieutenant Brereton also flew in the face of the high wind, rising high so as to avoid the treacherous air currents prevailing near the ground. It is hoped to make San Diego a permanent aviation ground for summer as well as winter flying.

Sunset Field, Cal.

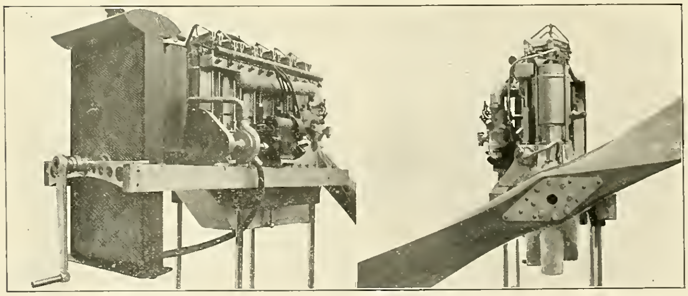
Harvey Crawford has been busy at the grounds making exhibition and passenger flights and instructing several pupils. Takasow and George Cohelan are progressing rapidly, as is Fred Clevenger, who is working as Crawford's mechanic and learning to pilot the machine as well. Crawford has started the construction of a new plane which will have a span of 31 feet and a chord of 4 feet 8 inches and to be equipped with 100 H. P. motor. As soon as the machine is completed it will be sent to Tacoma, Wash., and Crawford will attempt to fly from there to Seattle, Wash.

Bob Fowler, the transcontinental flyer, has located a school at the field, his first pupil being Bob Kurrle. Fowler has installed an 80 H. P. motor in his tractor and the machine can now climb 4,500 feet in eleven minutes. The Gage tractor which he is using has been considerably improved by streamlining the nose of the fuselage off and placing the gasoline tank and radiator above the fuselage.

Much Activity in the Aeronautical Society

The Aeronautical Society continues to hold its weekly meetings at the Club rooms in the Engineers Building, New York, and much interest is taken in the lectures and discussions, and also in the one design flying boat proposition referred to last month.

Amongst the well known men who have addressed the Club during the past month are: Garrett P. Serviss, Rev. Dr. Sidney Ussher, Mr. Turner, inventor of the dictagraph and Detective Smiley who has achieved great success with it.



Two views of the new Curtiss 6-cylinder 60 H. P. motor, showing the position of the radiator and gasoline tank and also the starting crank.

Art Smith Builds New Plane

Art Smith, the Fort Wayne aviator, and his assistant, Frederick Peters, have finished a new aeroplane at their factory in Fort Wayne. The machine which is of excellent construction, is to be fitted with the Kirkham motor which has stood Smith in such good stead in the past. A second machine is also being constructed and the two young builders hope to have it finished by April 1st.

Roy Francis, who has been flying a double propeller tractor biplane, has now joined the Curtiss company and his gone to San Diego to demonstrate the Curtiss flying boat.

At the Christofferson School the pupils have put in a lot of practise. Arthur Rybitzki has been especially enthusiastic, making no less than a dozen practice flights in one day. Christofferson had the novel experience of taking up as passenger a lady eighty years old and weighing in the neighborhood of 220 pounds. He was up with her 20 minutes, flying out to the Golden Gate and around Alcatraz Island and upon landing she expressed herself as delighted with the trip.

T. T. Maroney Made State Aviator

Mr. T. T. Maroney, who has been making some excellent flights at Helena, Montana, was recently elected an honorary member of the Montana National Guard and the title of official state aviator conferred upon him.

Otto W. Brodie Successfully Makes Aerial Parcel Post Deliveries

Otto W. Brodie, in his Farman biplane, recently successfully delivered parcel post packages over the first aerial route established between Clearing and Argo, Illinois.

Brodie was sworn in by the Clearing Postmaster and made the trips to and from Argo without mishaps of any description. He made his deliveries of parcels with the precision of a veteran letter carrier and was warmly congratulated by observers of the first successful aerial parcel post.

The Wilson Hydro-Aeroplane

A newcomer in the aeroplane field is the Wilson hydro-aeroplane, constructed by Mr. Wilson, of Port Jefferson, L. I. The Wilson machine is a biplane, having a spread of 36 feet, and fitted with both front and rear elevators and a single central float of Curtiss type.

Mr. Wilson is a sail maker and boat maker of considerable experience, and his experience in these lines should stand him in good stead in the aeroplane line.

Benoist Flying Boats to Use Sturtevant Motors

The new Benoist flying boats and hydro-aeroplanes can now be bought equipped with Sturtevant motors, and it is safe to predict that this splendid combination will add much to the already large success of both the Benoist planes and the Sturtevant motors.

The Burgess Company and Curtis to Produce a "Scooter"

It is announced that the new sportsman's hydroaeroplane to be brought out by the Burgess Company and Curtis will be called a "Scooter," as it is intended that the new machine will be more of a high speed skimming motorboat than a true aeroplane, although it will be capable of flying as well.

U. S. Naval Aviation Camp Re-established at Annapolis

The winter camp of the United States Navy aviators at Guantanamo, Cuba, has now been broken up and the aviators and machines returned to Annapolis, Md. Lieut. John H. Towers has been placed in charge, while Lieut. Theodore G. Ellyson, who formerly directed the camp at Annapolis, is now on duty in connection with aviation at the Navy Department.

Air Corps Goes to Texas

Twenty-five men of the Fort Omaha aerial corps left Omaha on March 10th for Galveston, Texas, to join the troops in camp there. They will be given flying instruction by officer aviators from College Park, Washington, D. C., and the equipment will consist of four aeroplanes. The members of the corps understand that they are to act as air scouts in the event of trouble over the Mexican situation.

Aeronautics in Philadelphia

The "Aerial League of Pennsylvania" is the new name given to the Aeronautic Society of Philadelphia, which continues to hold its regular meetings every Friday evening.

The officers elected are: Kenneth Robertson, President; Edwin J. Doyle, Treasurer; D. Earle Dunlap, Secretary.

Hild Flies from Hempstead to New York

On March 4th Frederick C. Hild, who just recently received his pilot's license, flew in his Blériot type monoplane from Hempstead Plains, L. I., to New York, landing on Blackwell's Island.

Excellent Business Prospects for Kemp

Mr. George W. Kemp, the enterprising head of the Kemp Machine Works at Muncie, Ind., manufacturers of the Kemp aeroplane motor, states that prospects are most encouraging for a large trade in aeronautical motors this year, as he has already received over 250 inquiries for motors since the beginning of the year, from which several sales have already resulted.

San Antonio, Texas

The Lillie School is ready to close up winter quarters and move back to Cicero Field, Chicago, Ill. The first class will open there on April 6th and several pupils are already in Chicago waiting for the opening of the school. Two "Airboats" have been added to the school equipment, same being built by the newly organized Weckler-Armstrong-Lillie Company. The airboats are of the tandem monoplane type and are equipped with the popular Deperdussin control. Model "A" has a seating capacity of four and Model "B" of two. All boats are equipped with double control and pupils are taught by Max Lillie, Superior Licensed Pilot No. 1.

The land equipment of the Lillie School consists of three biplanes, and they expect to add a monoplane within a month. It will probably be a Nieuport, which the Lillie instructors are already familiar with, having used one at the Cicero Field last summer. The teaching faculty is the same, consisting of Lillie, Thompson, Drew, Vought and McGuire, all men of exceptional ability and experience.

Kirkham Aeroplane and Motor Company Reorganization

At its first meeting of the new reorganization the Kirkham Aeroplane & Motor Company a progressive programme is adopted which will prove interesting and valuable for a motor purchaser.

Mr. Kirkham's experience with motors for aviation purposes dates back to 1903, when, as the manufacturer of the motors used on the Curtiss motocycle, several motors of one and two cylinders and one four-cylinder were made for various parties, one of these being for a dirigible known as the "Montana Butterfly."

Since that time several motors have been sold for aviation experiments, one of which was purchased by J. A. D. McCurdy to put into the Silver Dart, one of the machines built by the Aerial Experiment Association, the Silver Dart being Mr. McCurdy's production.

With this motor several flights up to 20 minutes' duration were made in 1909. Later this motor was installed in the Baddeck II, a biplane of 53 feet spread. This machine made several successful flights, one being of 45 minutes' duration. In a number of flights a passenger was carried. In August, 1910, a duplicate of this motor was sold to Tod Schriver, once famous as a flyer. One of his early flights being of 51 minutes' duration by moonlight, made at Mineola in September, 1910.

The policies that the new company has adopted are the same that Mr. Kirkham has followed for years, that all motors are of unquestionable workmanship, unequalled durability and a motor which the aviator can fix his own waiving dependency, built with conscientious labor and attention, in which no expense will be spared to make it a positively reliable motor.

These are qualities which will interest the prospective customer.

The company announce that they will put on the market for 1913 a four-cylinder 45 H. P., six-cylinder 65 H. P., six-cylinder 65 H. P. gear drive, eight-cylinder 110 H. P., and say that these motors are considerably rated and will develop at actual break test at least an excess of 5 H. P.

The Weckler-Armstrong-Lillie Company Organized to Manufacture Airboats

A new company which should soon rank as one of the leading aeroplane concerns in this country is the new Weckler-Armstrong-Lillie Company, who will put on the market a novel tandem wing-flying boat. The personnel of the company should guarantee the success of their product. The President is Mr. Adam F. Weckler, a well-known boat builder; Mr. E. R. Armstrong, well known as an aeroplane designer and constructor is the designing engineer of the new concern, while Mr. Max Lillie, the famous pilot, is instructor and sales-manager.

New Benoist Flying Boat Great Success

Two very successful trial flights were made with the new Benoist airboat (description and scale drawings of which appeared in the February, 1913, issue, pages 346 and 347) on March 9th, on the Mississippi River, St. Louis. The machine, which has been slightly altered and fitted with a small stabilizing tail in the rear, was tested by Hugh Robinson of the Benoist Company, who handled the craft with as much ease and skill as the ordinary land aeroplanes.

The first flight started about 2 in the afternoon and lasted for thirty minutes, and on the second trial, starting a little after 4 o'clock, Robinson flew for over forty minutes, during which time he raced with motorboats, made sharp turns, flew under McKinley Bridge and put the machine successfully through every conceivable test.

Aeroplanes Win Battle

A late cable under date of March 19th states that on March 18th, through the splendid work of two Turkish aeroplane scouts, the Turks not only repulsed the Bulgarian attack on the Chataldja lines, but that they advanced and routed their enemy.

The two Turkish aeroplanes flew over the scene of the battle throughout the day, reconnoitering the Bulgarian positions and signalling all the enemey's movements to the Turkish commander.

New Corporations Formed

January 21, 1913.

The First American Passenger Sailing Airship Company, Inc., New York City. Capital, $20,000. Incorporators: Frank Weninger, 122 Schenectady avenue, Brooklyn, N. Y.; George A. Faller, 74 Schenectady avenue, Brooklyn, N. Y., and Tony Mundus, 495 Bainbridge street, Brooklyn, N. Y.

February 3, 1913.

Aeroplanes, Motors and Equipment Company, Incorporated, New York City. To manufacture and sell aeroplanes and equipment for same. Capital, $20,000. Incorporators: Bernard Cowen, 76 William street, New York City; Max Miller, Audubon place, New York City, and Maurice Lazone, 88 Bleecker street, New York City.

February 5, 1913.

Chrome Manufacturing Company, Inc., New York City. To manufacture motors and other equipment for aeroplanes, dirigibles, etc. To hold exhibitions of aeroplanes, balloons, etc. Capital, $25,000. Incorporators: James E. Marshall, 25 West 136th street, New York City; William H. Buckley, 445 Lenox avenue, New York City; William P. Green, 21 West 134th street, New York City, and Alfred J. Simmons, 68 West 139th street, New York City.

February 10, 1913.

Cordeaux-Etter Manufacturing Corporation, Brooklyn, N. Y. To manufacture and deal in accessories of every kind used by aeroplanes, aerial craft, balloons, etc. Capital $10,000. Incorporators: Theodore H. Klein, 273 Halsey street, Brooklyn, N. Y.; John Winne, 534 West 124th street, New York City, and Walter Schulman, 40 West 127th street, New York City.

February 25, 1913.

The Kirkham Aeroplane & Motor Company, Inc., Savona, N. Y. Capital, $100,000. Incorporators: Edwin H. Skinner, South Beach, N. Y.; Charles B. Kirkham and Stanley I. Vaughn, both of Savona, N. Y.

Aquaero Manufacturing Company, New London, Conn. To manufacture aeroplanes. Capital $60,000. Incorporators: Henry R. Bond, Jr., Edward C. Hammond and P. Leroy Harwood, all of New London, Conn.

Keystone Aircraft Company, Philadelphia, Pa. To manufacture aeroplanes, hydroplanes and aerial craft and equipment of all kinds. Capital $100,000. Incorporators: H. P. Fry, C. W. Jones and John Kelly, all of Philadelphia, Pa.

Correspondence

March 5, 1913.

Mr. Alfred W. Lawson,
Editor Aircraft Magazine,
New York City:

Dear Sir—Your article to Congress on Aerial War Crafts and our trailing position compared to all European countries of note, even little Greece, is straight from the shoulder and should stagger that body to a man.

While you have given (only too true) some appalling facts and figures, I am afraid our weakness must be demonstrated to some of our sleeping Congressmen by the dropping of a real bomb in their very midst from the deck of a modern Zeppelin.

The tremendous lead all European countries have over us in numbers of aerial war crafts is stupendous, but the half has not been told. For, while in Europe recently (a contestant in the Gordon Bennett balloon race), I witnessed the miraculous maneuvers of the Victoria Luise (Zeppelin type), both in Stuttgart and Frankfort-on-Main, I made photos of her in air and at close range, examined her mechanism, etc. Saw and marveled at the great ease and grace she was manned during the trip. Brought to earth and docked, as it were, during a high wind, with the ease of any of our smallest launches, which was proof positive to me that she is a mighty vessel, under perfect control of an able skipper and crew. Such a ship could destroy a large city in a few hours, put to flight a great army in as many minutes and disable a dreaded Dreadnaught in a few seconds.

The price of a single battleship each year applied judiciously in aerial war crafts and training will save our country from foreign invasion, which is sure to menace our coast cities in the very near future if not prepared. Why haggle over a second battleship? Apply the money where it will do the most good. Yours very truly,

H. E. HONEYWELL.

CLASSIFIED ADVERTISING

20 CENTS A LINE — SEVEN WORDS TO LINE — CASH WITH ORDER

FOR SALE

CURTISS latest improved type (Pigeon Tail) 1912 Model. Made over 300 very successful flights 1,000 ft. high, 30 miles cross-country. My construction is strongest in the world. New, complete, ready to fly, tested and guaranteed, including free lessons to buyer, $1 500. Buy direct from Builder and Aviator of 10 years' experience. H. C. Cooke, Aviator and Builder, 127 West 64th St., New York City.

BIPLANE—37x5 7/12x25 feet; Maximotor 60-75 H. P., for sale for about giving away price; aviator made fine flights; the honest reason is have to leave in May for Europe, for good; I myself cannot fly; cheap to quick buyer. Romain, 17 Prospect Ave., Buffalo, N. Y.

ANTOINETTE AERO MOTOR FOR SALE 70 H. P. water cooled, practically unused, fine condition. Regular price, $4,000.00; going for $400.00. Also 4 Bosch Magnetos and a quantity of engine fittings. Address Box 800, care of "Aircraft."

FOR SALE—At a sacrifice, one new 4-cylinder 50 H. P. Maximotor, 1912 model, complete with radiator and propeller, $400, for immediate acceptance. H. A. Elliott, 507 Majestic Building, Detroit, Mich.

FOR SALE

NOW FOR SALE—Snyder aeroplanes latest improved Model, fully equipped 6-cylinder 75 H. P. motor; propellers and supplies furnished; aviators wanted. THE SNYDER AEROPLANE COMPANY, Osborn, Ohio.

FOR SALE—Tractor biplane, 42-foot spread, 5-foot chord, double surfaced, Farman running gear, 8-cylinder 60 H. P. motor, Bosch magneto, Schebler carburetor, radiators, combination tank, 8-foot Paragon and Normale propellers, extra parts, tent, crates, complete exhibition outfit, would make fine hydro-aeroplane; will sell without power or power plant separate; price $1,500. F. Robinson, 191 Caledonian Ave., Rochester, N. Y.

PROPELLERS—We are disposing of our stock of 50 propellers, ranging from 6 to 8 feet, various pitches; these are of standard design and construction, five laminations of spruce; these propellers will be forwarded C. O. D. subject to inspection, allowing thorough examination before accepting; price $16.50. The Western Aeroplane Supply House, Sedalia, Mo.

MISCELLANEOUS

WANTED—Second-hand aeroplane motors, 25 H. P.; send particulars and lowest cash price. Paul Rohrer, Berne, Ind.

MISCELLANEOUS

WANTED—An apprentice to learn the aeronautical publishing business; must be a New Yorker, not over 18 years of age, well educated and have a good general knowledge of aeronautics and the movement's history during the past few years; state full particulars in first letter. Address Box 802, care AIRCRAFT.

OPEN FOR SEASON 1913—Well-known exhibition flyer, owning highest class passenger carrying outfit wants contract with exhibition company or manufacturer. Address Box 801, care AIRCRAFT.

CO-OPERATION WANTED

INVESTMENT—Wanted, young financier, enthusiastic, interested in aviation, to invest from $15,000 to $20,000 in new aeroplane proposition; Al references; principles only. Address Box 803, AIRCRAFT.

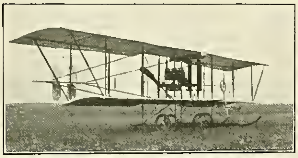
I HAVE a patent on a new type of air craft; machine rises without running start; desire to communicate with person who will finance building machines. Address G. Snow, Canton, Texas.

LEGAL NOTICE

I DESIRE to give notice to all persons that are using my "Patent Rudders" (Serial number 504107 U. S.), also France and England, and my "Semi-Automatic Engine Control," (Serial number 646300 U. S., France and England), that it is my intention in the future to ask a small royalty from them. Hugh L. Willoughby, Sewalls Point, Florida.

Tuition $250 **THOMAS** School Now Open

Why pay more when you can secure a Thomas at less expense?



1913 Model "Thomas 65"—Holds American Endurance Record with a Passenger

A standard exhibition Thomas 10-A X, equipped with a 65 h. p. motor in competition with 75 h. p. machines of another make, won all first prizes for speed at the N. Y. State Competitive Meet, Sept. 14, 1912. For particulars address

Thomas Brothers Aeroplane Co. **Bath, N. Y.**

WIRE

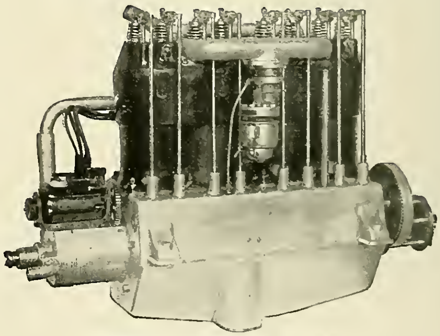
Aviator Wire supplied in 12 sizes with a plate finish, making soldering easy. This wire is specially drawn from extra quality high grade steel. Also Aviator Cord of twisted wire.

John A. Roeblings Sons Co.

TRENTON, N. J.

MAXIMOTOR

THE AVIATOR'S CHOICE



MODEL B, 4-CYLINDER, 60-70 H. P.
Weight complete 260 lbs.; 500 lbs. thrust.

Three other models correspondingly

SIMPLE, COMPACT, POWERFUL

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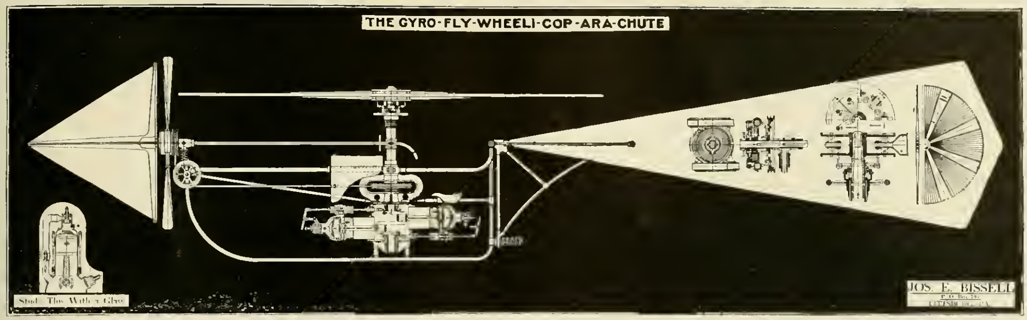

BIRD MAN, ATTEND! BEFORE THY SOUL
TAKES CHANCY FLIGHTS BEYOND TH' POLE,
DUPED BY EFFEMINACY IN TH' ROLE
OF GOOD REPUTE.

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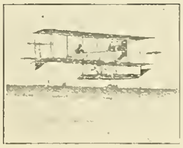

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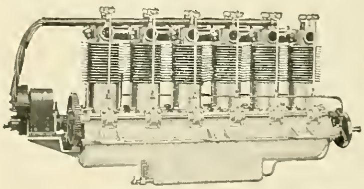

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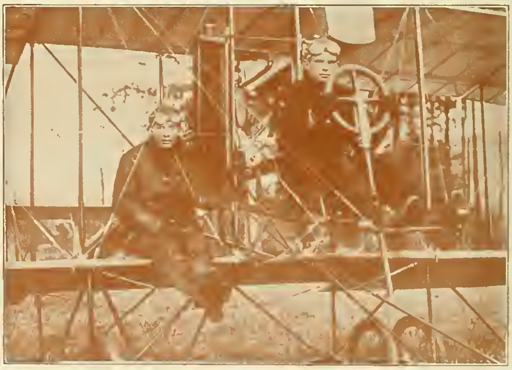

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AIRCRAFT

Vol. 4 No. 3 MAY, 1913 25 Cents a Copy

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Upon arrival they remained in the air 1 hour, 2 minutes longer, breaking the American Endurance Record for pilot and passenger, with a total of 4 hours, 22 minutes in the air.

On March 31 the return trip was made in 3 hours, 50 minutes, in very rough weather.

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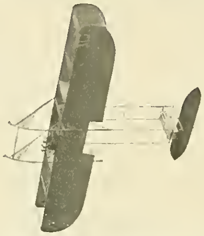

Philips W. Page flying in Burgess-Wright Machine equipped with 40-H. P. Sturtevant Motor

The Motor mentioned in the following clipping from a Washington paper is one of the several Sturtevant muffled motors in daily operation at the Army and Navy Aviator camps.

AVIATORS LONG IN AIR

Army Officers in Southern Camps Making Records. Four New Details.

Notice has been received at the War Department of several important flights made by the army aviators at their southern winter camps. Lieut. Thomas Milling, in what is known as the Burgess tractor, with Lieut. Sherman as passenger, flew from Galveston to Houston and returned, a total distance of ninety miles, in about an hour and a half. He circled the city of Houston in the course of the flight and passed through two rainstorms.

Lieut. Harry Graham, with Lieut. Call as passenger, flew over approximately the same course in the Burgess machine equipped with a Sturtevant motor. They covered a distance of about eighty miles and passed through one rainstorm in the course of the flight.

Lieut. Kirtland, with Sergt. Idzarik as passenger, started over the same course, but after covering about forty-five miles was compelled to stop on account of the rain.

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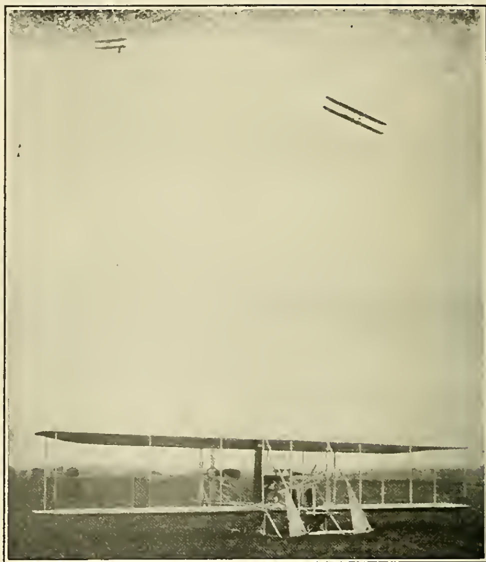

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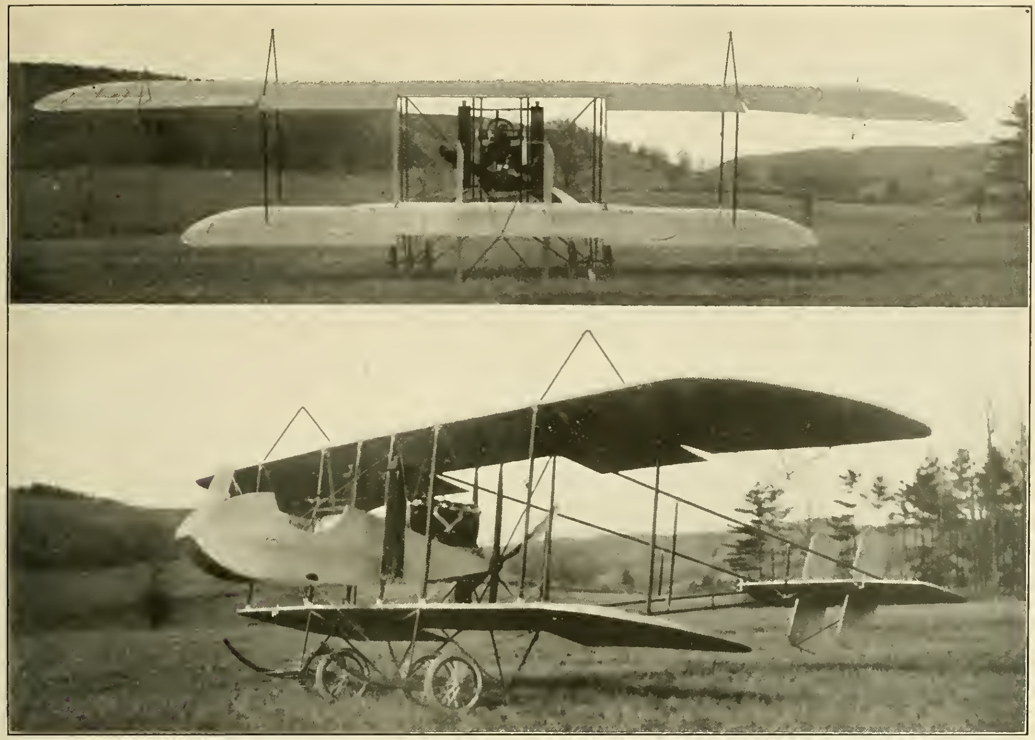

Two views of the latest Thomas biplane built for Walter E. Johnson. As can be noticed, this new biplane embodies all the latest American and European ideas in biplane design and construction, viz.: enclosed body with wind shield to protect the aviator—large span top planes rounded off at the front corners and sweeping outwardly towards the rear to accommodate the ailerons at the widest part of the machine, thereby increasing the leverage and efficiency of the control as repeatedly pointed out and advocated in AIRCRAFT. The tail is of the well-known Thomas two-in-one type, the vertical rudders being attached directly to the elevator flap and moving with it up or down. The motor used is a 6-cylinder Kirkham placed fairly high, which allows of a low landing chassis and increased safety in alighting.

CONTENTS—MAY, 1913

AIRCRAFT

ALFRED W. LAWSON
President and Treasurer
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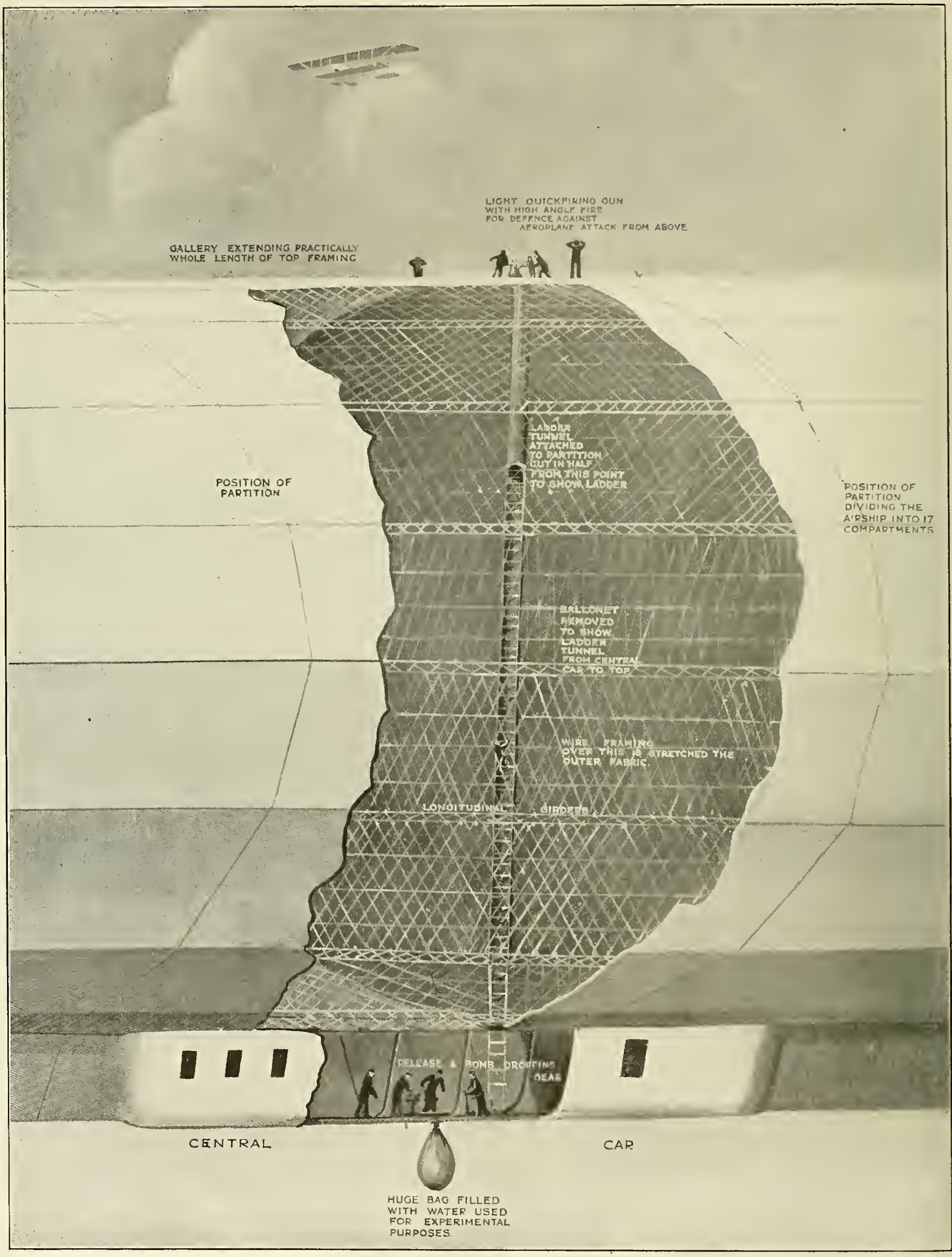
THE LATEST MILITARY EXPERIMENT WITH ZEPPELINS



This drawing, by G. H. Davis, for the *Sphere* (London) depicts the amidship section of a Zeppelin with guns on the roof and bomb-dropping from below. The fabric has been cut away to show the delicate tracery of steel and aluminum. In the newest type a ladder passes right through the center of the vessel from the central car to the top of the envelope. This top is strengthened by steel framing, and upon it is mounted a light quick-firing gun to defend the ship against aeroplane attack from above. The gun platform is placed over one of the seventeen partitions of the Zeppelin's envelope. The bag suspended below the car has recently been used for experimental purposes. It was filled with 1,320 lbs. of water to represent explosives, and dropped. The impact made a hole 18 ft. wide and 3 ft. deep, and fragments of the bag were picked up at a distance of thirty meters. The dropping of this weight in no way affected the stability of the airship.

AIRCRAFT

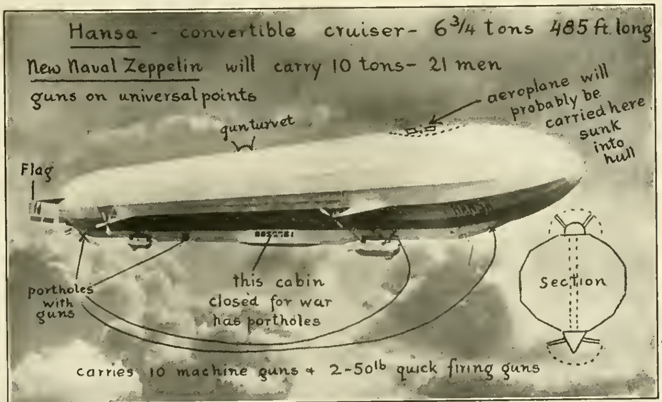
Vol. 4. No. 3 NEW YORK, MAY, 1913 25 CENTS A COPY $2.00 A YEAR

AIRSHIPS THE KEY TO NAVAL STRATEGY

By T. R. MAC MECHEN

WHY is Germany confidently spending $12,500,000 for a fleet of sea-going Zeppelins? Because the Zeppelin airship now insures new aerial tactics that make Germany positive of her ability to crush England's superior naval fleet. General von Bernhardi, the foremost living German authority on military science, has already announced that the Zeppelins are of "supreme importance for winning the 'freedom of the sea.'"

Captain von Pustau, another German military authority, goes further: "England's otherwise all-mighty fleet is now powerless against our Zeppelins and Schuette-Lanz rigid airships. England has nothing to oppose their attack. Great Britain will never be allowed to impose a 16 to 10 ratio on Germany in the air, as she has done on the water. It would be a false elementary principle of strategy if we permitted any foreign power to overtake us in the race for the mastery of the air. That is the psychology of our aerial programme."



T. R. MacMechen's idea of the manner in which the passenger-carrying Zeppelin "Hansa" will be converted into an armored cruiser in case of war.

Germany's programme is to command the sea, from the air. If it can be demonstrated that her airships can command the situation in a sea fight, then Germany's new tactics cannot be much longer ignored by the Navy of the United States. Admitting for the moment that the Zeppelin airship is all-powerful, let us analyze how this would affect naval warfare as we now know it.

In naval warfare, scouting from the air has a much greater importance than in land war. It is absolutely vital because sea fleets cannot be disguised. It is not possible to hide from the enemy. An inferior fleet, when assisted by aircraft, should crush a superior fleet that is not aided by aircraft for the reason that the superior fleet will never get sight of its antagonist. The inferior fleet will always hide below the horizon, while its airscouts will not only direct it where to move to escape the eye of the enemy, but will show which side to attack, in order that it may crush ship after ship before the others can render assistance.

Germany's plan is that her combined naval and air fleets shall attack together. The first use of aircraft is for scouting. In order that Germany's inferior fleet may avail itself of the advantages of keeping out of sight, that nation demands the largest and most enduring airships, because, in pursuing these new tactics, it is not sufficient to scout once or twice, but all the time. The airscouts must be an integral part of the naval fleet's entire movements. This is effected by transferring the admiral of the combined fleets to an airship; in other words, a Zeppelin will become the flagship of the combined water and air fleets. From that dominating position, the Admiral will command the entire area of operations for sixty to eighty miles. Always, he overlooks his own fleet below the horizon and the fleet of the enemy. At one and the same time, the enemy will be exposed to two fires — horizontal and vertical—directed by constant scrutiny.

A Zeppelin airship is the only air-vehicle with the endurance to make effective such an amazing plan of simultaneous scrutiny and attack. Germany, unlike England, has not relied on aeroplanes to accomplish her scouting at sea, because operations on the vast scale of Germany's new tactics require airships. German experience has shown that for her particular requirements, the aeroplane "gets out of breath" too quickly. In this instance, the German airscout must remain "en vidette"—on outpost all the time, like the screen of fast torpedo boats spread out before a naval fleet. Light aeroplanes, launched from shipboard, will be used by the German Navy to skim over the sea like gulls, peering into the depths for lurking submarines. But the airship fleet, hanging in the sky indefintely, since it can now refuel and replenish gas from colliers, will cruise above and far in advance of the naval fleet, but always able—like torpedo boats—to have under its omnipotent eye the enemy's strength, formation and every move.

It is only fair to the reader, to say that Germany has satisfied herself that her admiral in the air will command both friend and foe alike, with perfect safety, perfect circumspection and with an overwhelming advantage, from enormous distances. Indeed, to

perfect her scheme of using the free aerial highway to command all other forms of warfare, the marine Zeppelins are now engaged in night maneuvers over sea, with 40,000 candle-power searchlights fitted to the airship's forward navigating gondola. This light, from a height of 5,000 feet, illuminates perfectly, the surface of the sea. It has been demonstrated that anything on the water can be spotted. The airship gunners, using a special mechanism, swing their machine guns with the beam, thus enabling them to fire the instant that the target is revealed below. Then the searchlight is quickly shut off to permit the airship to change its position in the dark, which it does at high speed. The appearance of the airship is like that of a firefly. It confuses the gunners below. On the other hand, the instant that naval ships unmask their own searchlights, the focal points of these lights become splendid targets for the airship's steady stream of 500-a-minute machine gun bullets—a stream which, it has been demonstrated, is as easily directed as that of a garden hose. French, as well as German night maneuvers, have shown in practice that searchlights on the ground are unable to detect anything at great height. Beams from the earth gradually melt away in the empty sky, while those directed from the airship strike the ground. These tests with searchlights are vitally important because they illustrate how easily an airship can get squarely overhead and hold its searchlight on a dreadnaught, thus brightly exposing it to the enemy's fire.

Grand Admiral von Tirpitz, Naval Secretary of the German Empire, coming down the gangway of the Zeppelin airship "L. I." Note in this section of the gondola the end of the overhead shelter and the closed companionway or hatch, which, in the picture below, is shown open and also a near view of the ladder and its fittings which are as solid and as shipshape as those of an ocean craft.

It has been found hardly less difficult to discover an airship in the brightest sunshine, when that ship travels at a demonstrated height. Zeppelins are now coated with aluminum dust which refracts the glare to such an extent that the airship melts elusively in the neutral sky. Indeed, it is now known that a Zeppelin can cross the North Sea in broad daylight, without being detected. It becomes perfectly invisible against an ordinary gray sky. German infantrymen, looking over their rifle sights, have failed to see a Zeppelin that was maneuvering at a height of only 5,000 feet. Only recently was it realized that nature's moods—night, the gray sky, clouds and even glaring sun-lighted heavens—co-operate in concealing her denizens of the air, so that the risk from special high-angle guns is much less potent than earth-born notions have led us to suppose. This is all quite apart from the unconquered mathematical problem of finding the range and the time necessary to lay a gun that has the carrying-power to reach heights at which a Zeppelin now operates. These battle heights are indicated by the most recent maneuvers of the Zeppelin IV which remained at an altitude of 6,500 feet for the greater part of eighteen hours and later ascended to the extraordinary height of 9,840 feet, where it cruised for four hours, above the clouds.

This picture shows a close view of the bow of the forward "navigating gondola" or the "bridge" of a modern Zeppelin with the deck roof and glass window shield in front, which resembles closely the canopy over the side decks of ocean steamers. This fitting of the dirigible for work over sea is interesting in its resemblance to the ocean craft. The cross on the side of the gondola indicates Prince Henry of Prussia.

Underneath the forward end of the gondola is the "bumper" upon which the airship alights when descending to the ground. This is a pneumatic cushion which also serves for alighting purposes on the water as well.

The splendid workmanship manifested in the construction of the gondola and hull is also quite apparent.

Col. John Seeley, the British Secretary of War, announces that England has a new quick-firing gun for high-angle fire that can hit any aerial target at any height. It is not necessary to comment on this wizard gun. But Col. Seeley's intuition is that airships will have to abandon the idea of hovering over battlefields. Hovering over battlefields is not a part of aerial strategy. It has been frequently explained that the decisive attack will be made on dockyards, arsenals working at full pressure, or on ammunition trains and food supplies. These are the strokes, which, if successful, will end the war. While the British Secretary is evidently ignorant of the whole scheme of aerial strategy, Mr. Winston Churchill, First Lord of the Admiralty, only recently said in the open Commons: "It is evident that the time has arrived when we must develop long-range airships of the largest type. We propose to enlist the services of some great British manufacturer in the construction of rigid airships, and negotiations are now on foot which will lead to that result."

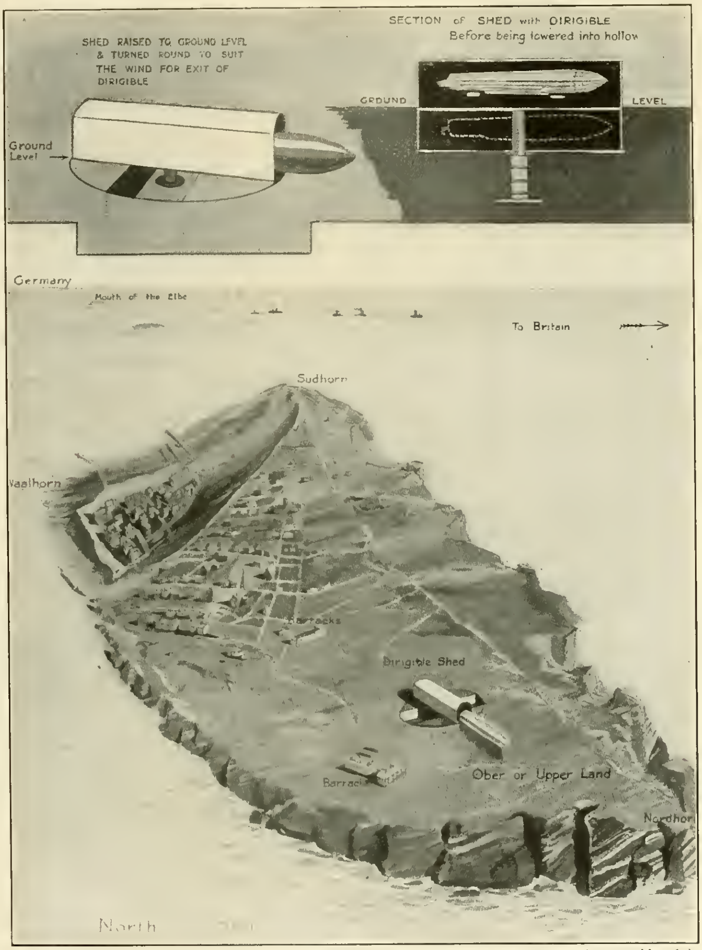
This is a plain admission that England was misguided when that nation relied entirely on the hydroaeroplane for her defense. Indeed, the German Admiralty is providing for only fifty large gun-carrying hydroaeroplanes, because its experts are convinced that this type of machine can only be used at a moderate distance from the coast. Once such a heavy craft has alighted on even a comparatively calm sea, these experts doubt if the machine can ever leave the water, since it sinks more deeply than the light hydroaeroplane. If rocked or pitched at all, it is believed that it could not gain the necessary poise for getting the air again. Consequently, the German Admiralty depends on the largest airships with sufficient endurance to remain in the air during the whole period of their mission, because only such craft can render the efficient all round sea scouting that the extensive scale of German operations demand.

It is hardly necessary for the writer to repeat the armament of the Zeppelin. This is well known in both France and England. The German government, since the recent successful tests of machine guns, fired from the top of a Zeppelin hull, has ordered that all German airships shall be armed in a similar manner. In addition, the ships have for sometime past carried their heavier armament of guns and bombs, in their cabins and gondolas. All of Europe now knows that the shooting tests made from the Zeppelins have amply demonstrated that it must be reckoned with as a powerful instrument of destruction.

A modern Zeppelin's radius of activity is not altogether measured by any such performances—as, say that of the big marine Zeppelin, which covered 1,067 miles, in 31 hours, through constant fog. This ship carried fuel for fifty hours, which is sufficient

for a run of 1,552 miles over the ground, at a cruising speed of 31 miles an hour. But the airship's radius is entirely different from that of a naval ship. A skillful commander who employs the highly developed art of navigation now used in directing a Zeppelin airship—that of rising or descending into favorable winds—gets fully fifty per cent. more endurance out of his ship. It is easily understood what this means in the case of the new Zeppelins which are now being built—Zeppelins which are able, with their gas-lift of 920,000 cubic feet, to remain in the air for four days and four nights, an endurance that is quite independent of refueling and replenishing by colliers. With such airships building, and still more powerful ships now ordered, the Atlantic Ocean should not remain long a barrier between Europe and America.

These advances certainly justify Germany's latest move to expend $37,500,000 more money on her preparations for aerial war. Now, is it wise for the United States to delay the experiment of constructing a large rigid airship when this government faces two facts that cannot be gotten around by any argument. The first is that neither this nation or any other nation has the secrets of a Zeppelin's construction, despite the nonsense in American newspapers about the French obtaining the secrets of the Zeppelin 4, when it recently landed in France. In Germany, visitors are taken all over Zeppelins for a few cents. Her secrets are only obtained from drawings, or by systematically taking the ship and her motors apart. Arming her with guns possesses no secrets. British and French engineers have signally failed to imitate a rigid Zeppelin. This country has not even a single experimenter who has ever tried to tackle the bewildering problems involved in its construction. The other fact is, that after the United States has built its first rigid craft, it must necessarily imitate Zeppelin by breaking several of these ships before we have learned the art of handling them. In the meantime, Germany is asserting her unquestioned supremacy over land and sea by rapidly upbuilding a navy of airships.

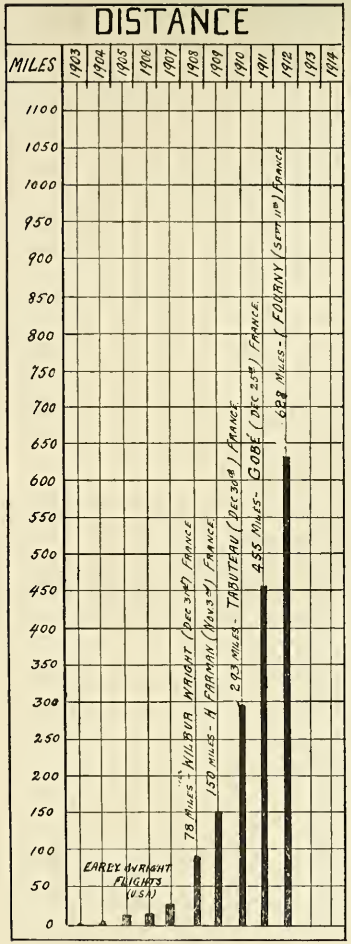


The above drawing from the *Sphere* (London) gives an idea of the plans now being considered in which it is proposed to make the Island of Heligoland the aerial stronghold of the Empire. It is intended to cover a natural chasm capable of housing 20 or more Zeppelins, with a bomb-proof roof through which, by using a huge revolving shed-elevator, the airship can be lowered out of sight and danger from a hovering enemy.

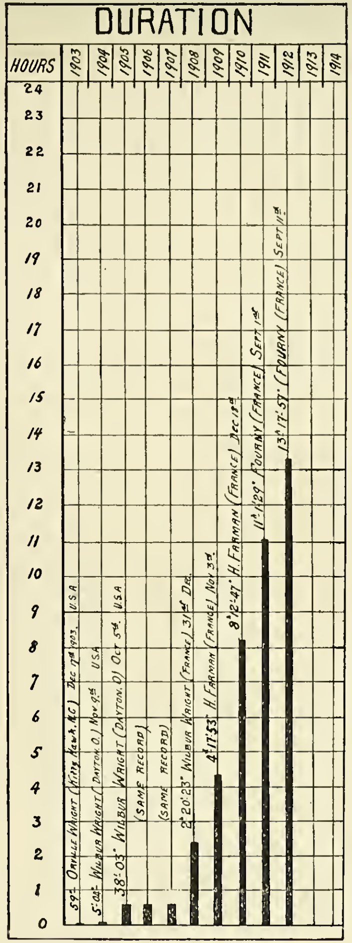
How does this progress affect the United States? Everyone knows that, though this country can afford to remain a negligible military power, we are compelled to be one of the strongest naval powers in the world. We must, unless we are satisfied to depend for our existence on the quarrels between European nations. At any time, the greater antagonism of continent to continent may develop. The tendency of our time is consolidation of small units and war between large units. The Monroe Doctrine is full of grave possibilities to the United States. It is an insufferable menace to Europe, once Europe has been internally consolidated. But the need of a very strong naval force can no longer be disputed with sound argument in America. Consequently, the United States, no matter what it may or may not do in military aeronautics, must possess a very strong aeronautical equipment for its navy. All the more if it desires to save expense. It has already been shown that the possession of adequate aircraft make an inferior navy the equal of a superior navy. From this fact, it follows that the desire of this Democratic government to reduce naval expenses can be fully realized if a small part of the cost of more dreadnaughts is used for an intelligent aeronautic equipment.

This naval aeronautic equipment should include the largest airships—the so-called marine airships. The airship, because of its superior elevation, its capability for remaining above the entire underspread battle area and its ability to take part in the attack, has the controlling power. These controlling ships must needs be the largest rigid airships, because only rigid airships have been successfully built and operated in large units. It remains for the present administration to achieve memorable fame for wise precaution, by appointing a proper commission to comprehensively investigate the whole situation now imposed by progress, and finally to report an intelligent plan of action to this government.

TABLE OF LEADING AVIATION RECORDS FROM YEAR TO YEAR



Non-Stop Distant Records



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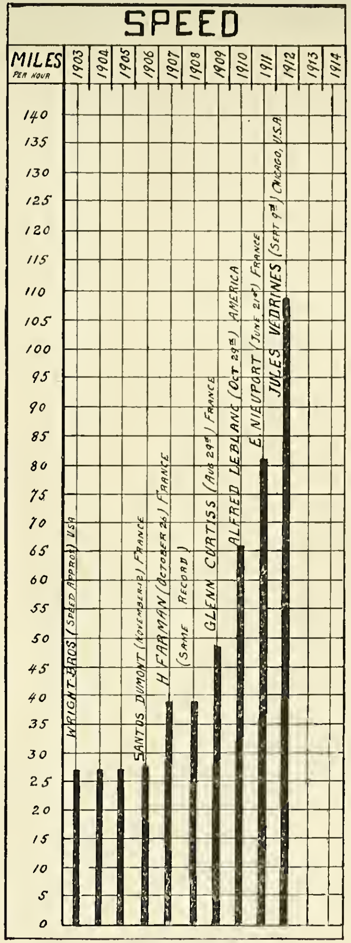
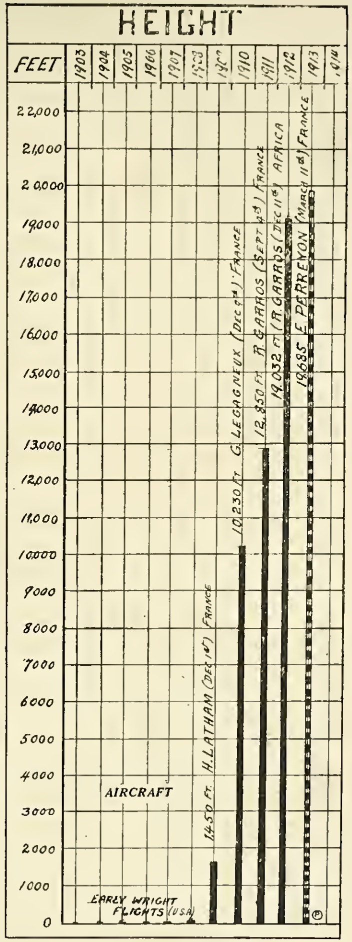


Speed Records



Height Records

EDITORIAL

A GENUINE OFFER.

LORD NORTHCLIFFE, owner of the London Daily Mail, has just offered a prize of $50,000 to the first person making a transatlantic flight in a heavier-than-air machine in seventy-two consecutive hours between any point in the United States, Canada or Newfoundland and any point in Great Britain or Ireland in either direction.

It makes no difference whether the aviator is an Englishman, American, Turk or Chinaman or of any other nationality.

The great feature of the offer is, however, that there is no time limit set for the start—the first person to do it gets the money, be it done next week, next month or next year.

The prize was put up to be won, not to be drawn down again just before a machine could be built capable of doing the work.

It will be recalled that this is the third time Lord Northcliffe has put up a $50,000 prize for aviators TO WIN. The first was won by Louis Paulhan in 1910 in a trip from London to Manchester, and the second was won by Andre Beaumont in 1911 in the English Circuit Race.

The Daily Mail of London deserves all the free advertising it can derive from this last offer of Lord Northcliffe, and it should be a lesson in true sportsmanship to some of our American newspaper owners who previously offered big prizes for aviation feats and then withdrew them before they could be won.

LIEUT. MILLING'S GOOD WORK.

LIEUTENANT T. DE WITT MILLING'S recent flight from Texas City to San Antonio, in which he carried Lieutenant W. C. Sherman as a passenger 240 miles without a stop in three hours and 20 minutes and then remained aloft another hour and two minutes before landing, not only broke two distinct American records but also proved that our American Military Aviators, while few in number, compare favorably with the leading military aviators of other countries.

Just to show how easy it was, Lieutenant Milling, accompanied by Lieutenant Sherman, flew back again from San Antonio to Texas City in three hours and fifty minutes without a stop a day or two later.

During the trip Lieutenant Sherman sketched a map of the country over which they flew and compiled some important data on the atmospheric conditions.

Both trips were made in a Burgess tractor biplane.

What we need in this country now is about one thousand or more military aviators of the Milling and Sherman type and about a thousand military aeroplanes for them to operate.

Then your Uncle Sam could feel a bit proud of himself and hold his head erect with dignity when discussing the world's progress with his European, Asiatic and South American neighbors.

AN INSPIRING VISITOR.

THAT was a very interesting little excursion into France recently by the new Zeppelin IV, in which the German, after demonstrating his capacity for high flying by ascending to an altitude of 9,500 feet, landed squarely and with exceptional accuracy in the very heart of the French Military Grounds at Luneville.

Before the excited Frenchman had time to grasp the full significance of the proceeding or to thoroughly inspect the wonderful air visitor, the stolid German politely took to the air again and passed over the boundary line as though it never existed.

The latest word from France is that she will build nine large 20,000 cubic metre dirigibles at once.

$65,500,000 GERMAN AERIAL EXPENDITURES.

THE latest German program is to spend $37,500,000 during the next five years on its air fleet; $25,000,000 for the Army and $12,500,000 for the Navy.

Adding this to the $28,000,000 spent by the German Government during the past five years makes a grand total of $65,500,000 for the German air fleet altogether.

The writer recently offered a recommendation to Congress to appropriate $10,000,000 for an American air fleet. There were some narrow-gauge aeronautical people in this country who thought he was asking too much for Uncle Sam.

Well! In the face of what the Germans have already done and are now doing and are making preparations to do, we think that the sum of $10,000,000 would be rather a "one horse" appropriation for Congress to make for an American air fleet, after all.

THE BOLAND BIPLANE AND HYDROAEROPLANE

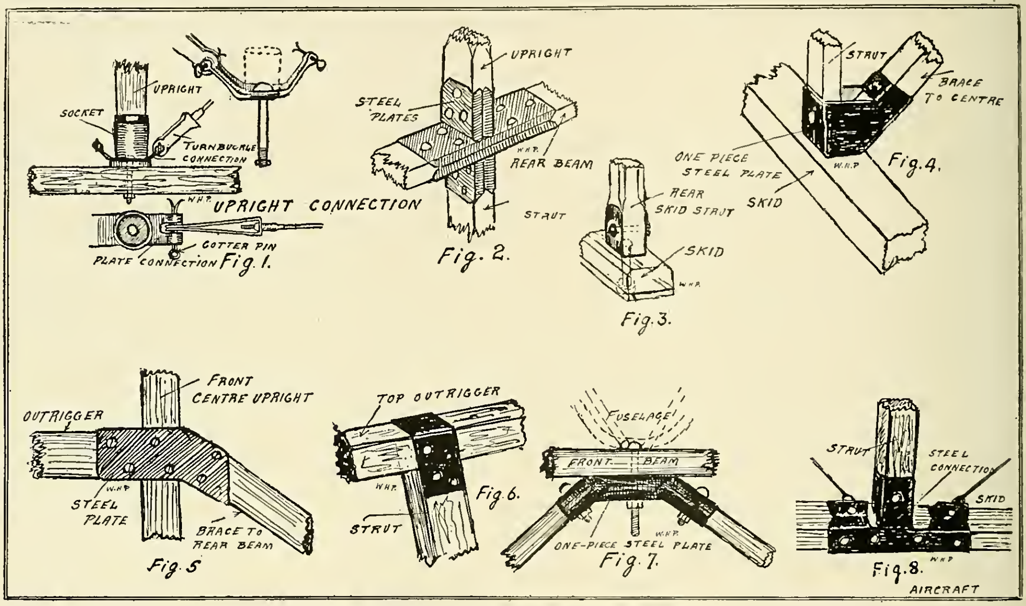
A TAILLESS, RUDDERLESS AND AILERONLESS MACHINE

By WALTER H. PHIPPS

In view of the recent decision favorable to the Wrights in the Wright-Curtiss suit, particular interest attaches to any machine embodying a new and distinctive control and to the Boland biplane in particular, as it is one of the few successfully demonstrated machines embodying an original control which the Wrights have not claimed an infringement on their own.

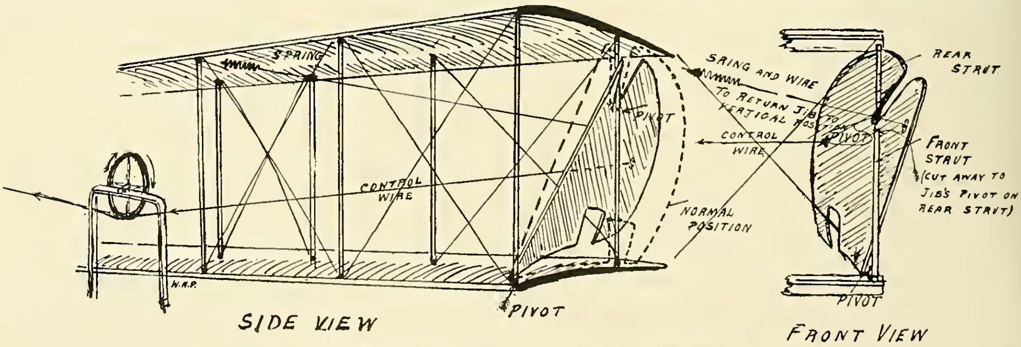
Aside from the control, the Boland biplane and hydroaeroplane has many novel features, both in design and construction, which merit consideration. As a type the Boland machine is of the "Canard," or front elevator design. It is, however, different from most "Canard" types in that there is no stationary surface in front, the large front plane being hinged and acting both as stabilizing plane and elevator. In this respect it is well to bear in mind that the Boland elevator is intended to be held stationary when in normal flight at a slightly greater angle than the main planes, which are set at an angle of three degrees. It is claimed that this system, which in principle is similar to the Drzewiecki and other tandem systems, about which so much has been said lately, makes the machine stable longitudinally under normal conditions, and that it will take care of the fore and aft balance in exactly the same manner as do the stationary front elevator types of models flown by our youthful model enthusiasts who have long ago come to realize the automatic compensating balance of the steeply inclined front elevator type, the functions of which some of the aeroplane experts are only just beginning to understand.

The striking feature of the Boland biplane is, however, the control which, contrary to the usually accepted type, dispenses with the vertical rudder entirely and does away with either warping wings or ailerons. In fact, there are only two controlling movements employed, namely, the pushing or pulling on the vertical control yoke for steering down or up and a turning movement of the wheel for steering to the right or left and at the same time maintaining lateral balance. It was the intention in designing this control to make the operation of the Boland aeroplane as simple as that of an automobile. When it is desired to turn to the left the steering wheel is moved to the left and the biplane immediately swings round in that direction, banking itself accordingly and preventing any tendency to sideslip. It is claimed that the jibs in their normal position will take care of lateral balance to a large extent, but, however, if one side or the other rises too much when struck by severe gusts, the operator simply turns his wheel towards the high side, thus pulling the jib in on the high side and creating in one movement a downward righting pressure and a slight drag, which accomplishes the



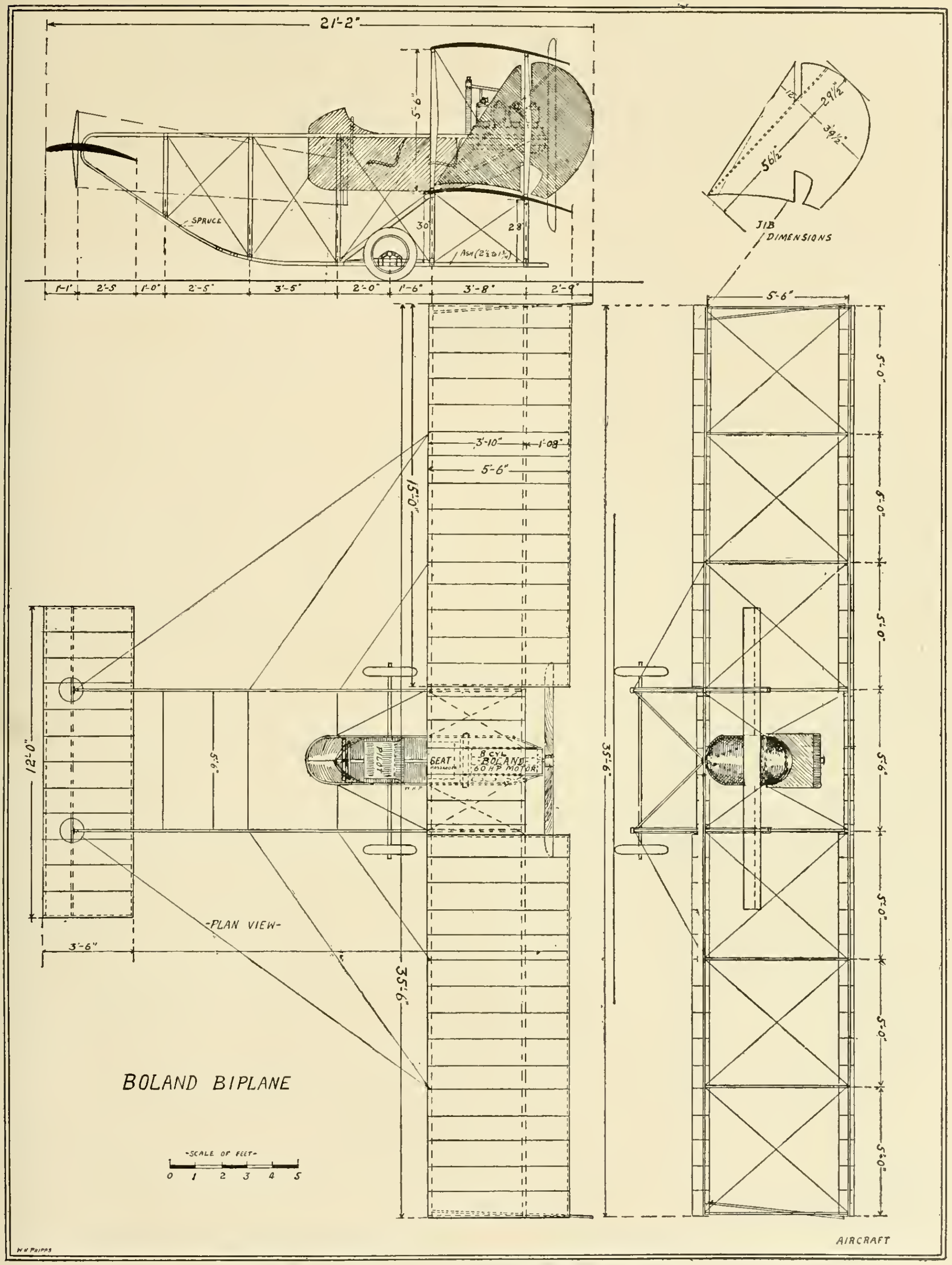
CONSTRUCTION DETAILS OF THE BOLAND BIPLANE.

Fig. 1 shows the upright socket and novel cotter pin turnbuckle and wire connection. Fig. 2 shows the method of joining the rear skid strut, rear main beam and rear upright. Fig. 3 shows how the skid is fastened to the rear skid strut. Fig. 4 illustrates the steel plate joint of the skid, front skid strut and central diagonal brace. Fig. 5 shows the steel plate jointing the outriggers, front upright and brace to the rear beam. Fig. 6 illustrates a front outrigger joint. Fig. 7 shows the joint fastening the fuselage body to the main beam and shows how it is braced underneath by the diagonals running to the skids. Fig. 8 shows a skid and strut connection



Diagrammatic drawing showing the operation of the Boland control.

Scale Drawings of the Boland Biplane



Side, Plan and Front View Drawings of the Boland Machine.

balance so much sought after, namely, the depressing of the high wing and at the same time slowing it up so that there is no tendency of the machine to turn toward the low side, as is the case with many other machines which necessitate the rudder being turned towards the high side to counteract the drag on the low side. It will thus be seen that the Boland side jibs accomplish the purpose of ailerons and rudder in one.

Turning now to a description of the machine itself, the general dimensions are as follows: Span, 35 feet 6 inches; length, 21 feet 9 inches; chord, 5 feet 6 inches; gap, 5 feet 6 inches; pontoons, 14 feet long; motor, 8 cylinder 60 H. P. water-cooled Boland motor, driving direct a 7-foot 6-inch Boland propeller; weight of complete machine, without operator, 900 lbs.; weight of motor, 240 lbs.

MAIN PLANES.

The main planes span 35 feet 6 inches, the centre section measuring 5 feet 6 inches; the two outer sections, which are built up in one piece, each wooden V-shaped diagonals which run up from the skids.

THE ELEVATOR.

The elevator, which is of large size, is pivoted 13 ft. 8 in. in front of the leading edge of the main planes. It is of a very pronounced curvature and measures 12 ft. long and has a chord of 3 ft. 6 in. When in normal flight the elevator is held at a lifting angle so that it is always carrying a certain amount of the load, which accounts for the position of the aviator well forward of the main planes. It is attached to the round-nosed pieces at the front of the skids, and has holes cut in the cloth, where these nose pieces pass through it. It is further braced by two steel posts, from which wires run to the front and rear edges.

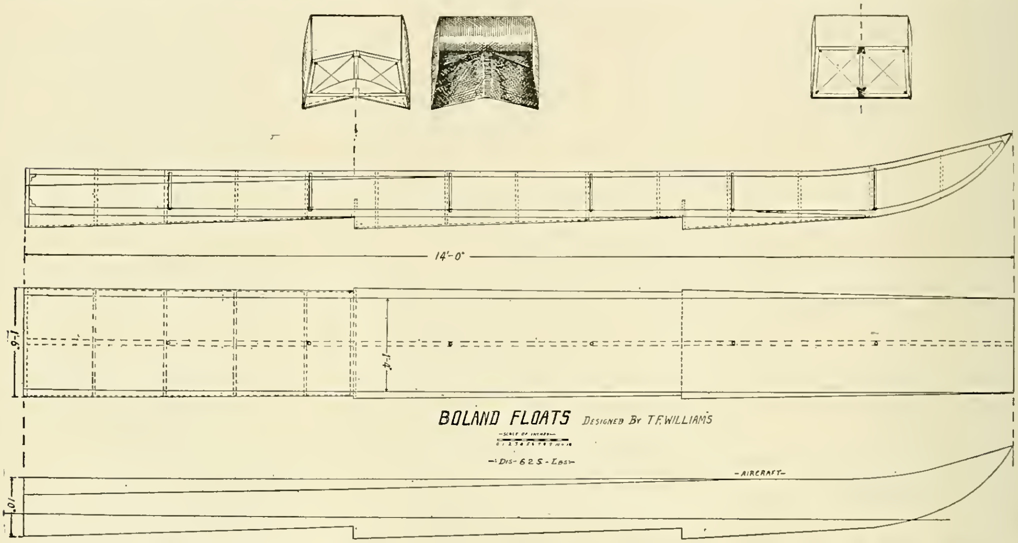
FUSELAGE.

The body, or fuselage, is of novel type, forming as it does, a complete power unit, in addition to a housing for the pilot and passenger. The two top members, which are of spruce, are of large dimensions, as they act as engine bearers. The body is desired to turn either to the left or right; the hand wheel is turned accordingly to the left or right and the machine immediately swings around, banking itself at the same time properly. When the turn is completed the wheel is simply brought back to centre and the machine immediately levels up.

The jibs are of novel shape and are hinged at the bottom corner of the front strut and about two-thirds of the distance up on the rear strut, as can be noticed in the diagrammatic drawing of the Boland control which accompanies this. When the wheel is turned the rear part of the jib is pulled in, thus presenting an obliquely inclined surface, which acts as a depressing aileron and at the same time creates a drag.

CHASSIS.

The chassis or running gear consists of a combination of two long skids and two 20 x 3 inch wheels placed 18 inches in front of the main planes, the rear portion of the skids taking the weight of the motor. The wheels, which are mounted on a single steel axle, are attached to the skids through the medium of rubber shock absorbers. The skids,



Working drawings of the Boland Floats designed by Mr. T. F. Williams, who is now connected with the firm. Each float is designed to attach to the skids by six bolts and weighs only 55 lbs.

measure 15 feet and have the uprights spaced 5 feet apart. The chord and gap is 5 feet 6 inches. The planes are double surfaced, the ribs being built up Wright fashion, with one inch by three-sixteenth spruce battens top and bottom, with small solid half-inch thick spacer blocks between them. The central section, which takes the landing chassis and the fuselage boat-shaped body and motor, is practically a unit to which the single piece outer sections attach through the medium of steel plate clips. The curvature of the wings is much more pronounced than in the early Boland, which had practically flat wings. The long flexible trailing edge is, however, still retained, and is one of the features of this machine.

The whole wing structure is characteristic of the general construction of the whole machine, being extremely simple and at the same time amply strong enough for its purpose. The main spars measure 3½ x 1 inch thick in the centre and taper to 1¾ x ⅞ inch thick at the extremities. The centre main spars are ash and are strengthened by rectangular in shape in front, but tapers on the under side in a V fashion to the front beam, where it comes to a point and is anchored by one large bolt, from whence it again spreads out and runs diagonally up toward the engine in the rear, where it is again braced by a pair of struts attached V fashion and fastened to the rear main spar by one bolt. The seat for the passenger is placed directly over the centre of pressure, so that when flying either with or without a passenger the balance is the same.

CONTROLS.

The chief feature of the Boland machine is, of course, the novel control, which does away with both rudders and ailerons. A pair of jibs only are used, and these are situated at the extremities of the main planes. Each works inwardly and in only one direction, and they are connected to a hand wheel mounted on a Deperdussin type control yoke, which operates the elevator in the usual manner. It is claimed that the operation of the machine is as simple as an automobile when it is where the wheels attach, are strengthened to eliminate straining and bending, while at the same time they are also braced by two diagonals running from the lower plane.

ENGINE.

The engine consists of an 8-cylinder 60 H. P. water-cooled Boland motor of the same type which has been used in all of the Boland experimental machines, the original of which is still in perfect running order after over three years of hard service. The cylinders have a bore and stroke of 4 inches and are brass water jacketed on the sides, with heads not being jacketed, however. The valves are of concentric type, the inlet being automatic, the exhaust mechanically operated. A very large hollow crank shaft is used, and all the bearings are of a generous size. The oiling system is by forced feed and splash. The weight of the engine complete, with carburetor, magneto and oiler, is 240 lbs.

THE FALLACY OF THE POSITIVE ANGLE

By ALBERT ADAMS MERRILL

WE start with the assumption that the power remains constant during the process of banking. Speeding up the engine is not necessary while banking. The use of the rudder as an offset is not considered, the point to be determined is what is the difference in the results on a machine of using a single aileron moved first to +15° on the low side and then to —15° on the high side. The right side is considered the high side.

We will consider the reactions only on the tips of the surface, and to avoid the use of calculus we will assume the pressures to be concentrated at a point on the tips. Consider the area of each tip to be 10 sq. ft., area of each aileron to be 1 sq. ft., both to be flat surfaces.

In the equations which follow let the subscripts $_l$ and r represent the left and right tips respectvely. Let C = the H. P. which is constant, let x_l and xr = the resistances of the tips at 100 mph as given by Eiffel.

It is evident that with the thrust applied midway between the

tips the speed of the tips will vary under the influence of the aileron and thrust until the resistances at the new speeds are equal. Only under this condition will there be a balanced system around the center of thrust.

Hence $\frac{x_1}{100^2} V_1^2 = \frac{x_r}{100^2} V_r^2$ where V_1 and V_r are the new speeds.

$$\therefore V_1 = \sqrt[2]{\frac{x_r}{x_1}} \times V_r \qquad (1)$$

As we have assumed the power to be constant we get

$$HP_1 + HP_r = C$$

$$\therefore \frac{x_1}{100^2} V_1^2 \times \frac{V_1}{375} + \frac{x_r}{100^2} V_r^2 \times \frac{V_r}{375} = C.$$

Simplified this gives:

$$\frac{x_1 V_1^3}{3,750,000} + \frac{x_r V_r^3}{3,750,000} = C \qquad (2)$$

We have now two simultaneous equations and five unknown quantities, but three of these we can get from Eiffel, that is x_r, x_1 and C, hence we can solve for V_1 and V_r.

We will first figure C. x_r (10 sq. ft. 6° 100 mph.) = 17.54.

$$\therefore C = \frac{2 \times 17.54 \times 100}{375} = 9.355 \text{ HP. and this is constant.}$$

If we move the aileron to +15° we get $x_1 = 17.54 + 5.38 = 22.92$. Introducing these values into equation (1) we get

$$V_1 = \sqrt[2]{\frac{17.54}{22.92}} \times V_r \qquad (3)$$

In equation (2) we have V_1^3, so cubing (3) and substituting in (2) we get

$$\frac{22.92 \times \left(\frac{17.54}{22.92}\right)^{\frac{3}{2}} \times V_r^3}{3,750,000} + \frac{17.54\ V_r^3}{3,750,000} = 9.355.$$

Solving we get $V_r = 102.2$ mph.

Substituting this value in equation (3) we get

$$V_1 = \sqrt[2]{\frac{17.54}{22.92}} \times 102.2 = 89.39 \text{ mph.}$$

To prove the work we will substitute these values in equation (2):

$$\frac{22.92 \times 89.39^3}{3,750,000} + \frac{17.54 \times 102.2^3}{3,750,000} = 9.355.$$

This proves the work. Note that pulling down the aileron on the left tip was for the purpose of raising the left side, the machine, however, is turning to the left. We will now solve for the banking.

From Eiffel we get the lift of the right tip at 100 mph., which is 109.3 pounds, at 102.2 mph. the lift will be

$$\frac{109.3}{100^2}\ 102.2^2 = 114.1 \text{ right tip.}$$

The lift of the left tip with the aileron at 100 mph. is 109.3 + 20.4 = 129.7. At 89.39 mph. we get

$$\frac{129.7}{100^2}\ 89.39^2 = 103.6 \text{ left tip.}$$

It is very evident that without the use of the vertical rudder as an offset to retard the right tip the low side would not be lifted and stability would be lost.

If now we move the aileron on the right tip to —15° $V_r = 89.39$ mph., $V_1 = 102.2$ mph., the lift of the left tip (low side) = 114.1 pounds and the lift of the right tip (high side) = $\frac{109.3 - 20.4}{100^2}$ $89.39^2 = 71.03$ pounds. It is very evident that the machine will at once regain its lateral stability.

In all modern machines using the positive angle a vertical rudder is an essential part of the means for maintaining lateral stability. The rudder is used to retard the faster moving tip and it checks the dangerous turning movement, and this increases the banking couple and forces the couple to act in the correct direction. Of course, when the speed of both tips is the same the full lift of the aileron is utilized. This co-operation of the rudder with the increase of the positive angle on the tip to be raised is the basis of the Wright patent.

Glenn H. Curtiss has claimed that with his system a vertical rudder is not needed as an offset. He could prove this beyond dispute by lashing his rudder and flying for an hour in a good breeze.

As between warping the whole wing and using ailerons or wing *tips* the latter systems are to be preferred. While the former is more efficient, the latter are simpler to construct and are safer structurally. It would be more efficient to steer a boat by bending the stern, nevertheless a rigid stern and a rudder is the only system a naval architect would think of building.

Although the Wright system is over twice as efficient as the Curtiss, I doubt if anything can be done with a Wright machine that Beachey cannot do with a Curtiss. Of what value, then, is this difference in efficiency? To change a Curtiss to a reversed Farman (negative angle) system all that is necessary is to cut the wires that pull down the ailerons. With this system the vertical rudder plays no part in maintaining lateral stability.

What is the sense of using three surfaces (two wings or ailerons and a rudder) to get a result when one wing tip moved to a negative angle will answer the purpose just as well?

A BILL

To Establish a National Aeronautical Laboratory.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a National Aeronautical Laboratory is hereby established under the direction of the Board of Regents of the Smithsonian Institution.

Sec. 2. That the functions of the laboratory shall be the study of the problems of aeronautics, with such research and experimentation as may be necessary to increase the safety and effectiveness of aerial navigation for the purposes of commerce and national defense.

Sec. 3. That the laboratory shall, under regulations to be established and fees to be fixed by the director, approved by the Regents and reported to Congress, exercise its functions for the military and civil departments of the Government of the United States, and also for any individual, firm, association, or corporation within the United States: *Provided, however,* That such individual, firm, association, or corporation shall also defray the cost of material and all labor of per diem employees in connection with such exercise of the functions of the said laboratory.

Sec. 4. That there shall be a director of the laboratory, who shall be appointed by the President, by and with the advice and consent of the Senate, who shall receive an annual salary of $5,000. All assistants, clerks, and other necessary employees appointed during the first year shall be reported to Congress.

Sec. 5. That the director shall have general supervision of the laboratory. He shall make an annual report, which shall be transmitted through the Secretary of the Smithsonian Institution, to Congress. The said report, among other things, shall report upon the work done for any individual, firm, association, or corporation, and the amounts paid by them to defray the cost of material and labor as herein provided. He shall issue bulletins for public distribution, containing such information as may be valuable to the Government or the public.

Sec. 6. That said Regents may rent such temporary quarters and obtain such permanent quarters as may be provided for by private contributions or authorized by Congress, and such books and periodicals may be purchased and subscribed for, and such sums expended for furniture, equipment, heating and lighting, stationery, and for such other contingent, incidental, and miscellaneous expenses as may be appropriated for by Congress.

Sec. 7. That the said Regents shall have power and authority to receive money or other property by gift, bequest, or devise, and to hold and dispose of the same in promotion of the purposes of the laboratory.

Sec. 8. That there shall be an aeronautical committee, to be composed of the director of the laboratory, the chief of the bureau of the War Department in charge of military aeronautics, an officer of the Navy Department in charge of naval aeronautics, to be designated by the Secretary of the Navy, the Secretary of the Smithsonian Institution, the Chief of the Weather Bureau, the Chief of the United States Bureau of Standards, together with not more than seven additional persons who shall be acquainted with the needs of aeronautical science, both civil and military, or skilled in aeronautical engineering or its allied sciences, who shall be appointed by the President, three of whom shall be residents of the District of Columbia, and the other four shall be inhabitants of some State, but not more than one of them from the same State. The aeronautical committee shall advise in relation to the work of the laboratory and the co-ordination of its activities with those of other governmental and private laboratories in which questions concerned with the study of the problems of aeronautics can be experimentally investigated. The members of the aeronautical committee shall serve without compensation, but shall be paid their actual expenses in going to and returning from Washington to attend the meetings of the committee and while attending the same. The period of service of the seven additional members of the aeronautical committee who are to be appointed by the President shall be so arranged that one member shall retire each year. Appointments thereafter shall be for a period of seven years each, and appointments made to fill vacancies occurring other than in the regular manner shall be made for the remainder of the period for which the vacancy exists.

WIRE JOINT EFFICIENCY

By ALBERT S. HEINRICH

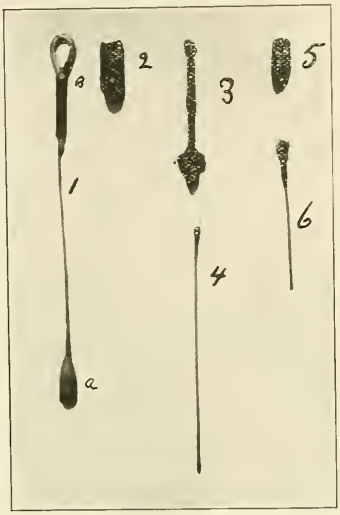
ALBERT HEINRICH has been a close student of aviation from both a theoretical and practical standpoint during the past five years. Prior to taking up the study of aviation he, together with his brother, experimented with high-speed boats, they owning some of the fastest boats on the South Shore of Long Island, which were designed, constructed and operated by themselves. After taking up aviation Albert Heinrich taught himself to fly a machine built by the Heinrich Brothers, who went into the manufacturing of aeroplanes as a business and have since met with considerable success. Mr. Heinrich is a strong believer in the future of aviation but thinks that the designers of aeroplanes should give as much, if not more attention, to practical, substantial construction as to the design of their machines. Mr. Heinrich has just finished the drawings of a new double seat machine, which will shortly be put upon the market, the design of which is equal to any monoplane now in this or any other country. Co-operating with James Means, of Boston, Mr. Heinrich has just worked out a new single lever three-in-one control.

Owing to the fact that a large proportion of aeroplane constructors make weak soldered joints on wire joints which have, as a rule, not more than 60 per cent. efficiency, caused by overheating the material when soldering, some information on the subject may prove helpful to those who have that sort of work to perform.

This information should be especially important to monoplane builders who, not knowing how to make proper wire rope joints, revert to the old Blériot style of steel bands for the main trussing of the wings, which crystalizes under vibration and break when the machine is in the air, causing, in most cases, a fatality.

Test No. 1, in the cut, shows the joint known as the engineer's joint at (A), and at (B) a special soldered joint, made up with great care, to test against the engineer's joint. The wire used is ⅛" wire rope, and the makers guarantee is 2,300 lbs. When this joint was put under test it did not show any signs of weakening at 2,400 lbs., when three strands of wire broke in the rope at joint (A), showing 100 per cent. efficiency in both joints.

No. 2 in the cut is a 1-16" cold rolled steel clip with a ¼" C. R. steel bolt, which was used in the eye of joint (B) to pull on in the testing machine. The joint (A) in the cut is made to fit the clip of a monoplane wing. No. 5 shows a joint of the same type with a forked end to fit a turnbuckle, as shown in No. 3. These joints are made of manganese bronze and are only 1¾" in length, and are cone shaped inside as shown in No. 1 in Fig. 2. The joint is made up as follows: The end of the wire is first wound with light copper wire about one inch from the end to keep it from unwinding and the outer strands are then turned back on the wire close to the winding and wound with light copper wire, as shown in No. 2, Fig. 2, and the core of the wire is then untwisted, cut off half way and hooked over as shown. The joint itself is the next to prepare; this is done by first dipping the joint in killed muriatic acid and then dipped into a crucible of molten solder. This should be good half and half solder and care should be taken not to heat solder too much. This can be gauged by sticking a piece of clean wood into the solder from time to time, and when the solder does not adhere to the stick any more it is ready for use, and when it starts to burn the stick black it is too hot. This should be watched closely when the wire is dipped into it, as over-



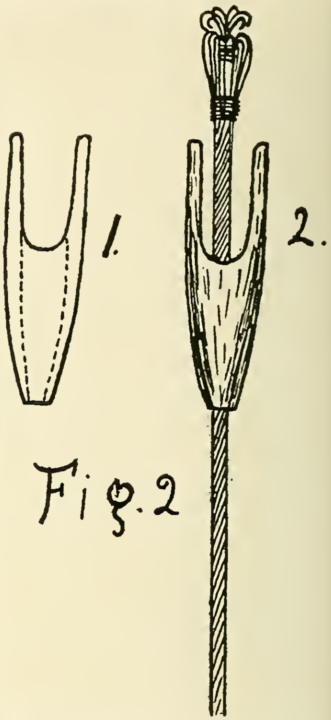
heating will kill the wire. After dipping the joint in the solder it is best to play a torch on it for a while and remove any surplus solder. The wire is next dipped into the acid and then into the solder the same as the joint, care being taken that both joint and wire are well tinned. The wire is now pulled down tight in the joint, both being warmed with a torch, and then the joint filled with babbitt metal, care also being taken not to overheat same.

No. 3 shows a turnbuckle with a forked end joint attached, and No. 4 a wire which was in this joint. This joint and wire were not tinned first, and when tested the wire pulled out as shown at 1,400 lbs.

Joint (B), in No. 1, was made up as follows: The wire was turned over a regular thimble about three inches down, and a small copper ferrule forced over the end to tighten the wire on the thimble the same as a ferrule is slipped over the wire in making the regular solid wire joint. The end was then wound with light copper wire and soldered. Over this was put a piece of copper tubing 2" long. The whole joint was then dipped into the acid and then solder was sweated well into all parts with a torch, but care was taken not to heat the wire too much. This joint as shown also showed 100 per cent. efficiency, but it took three times as long to make, and it offers double the resistance.

No. 6, in Fig. 1, shows a forked end joint and wire ready for the joint.

Solid wire should always be avoided in the construction of aeroplanes where lengths are long



enough to produce vibration, as vibration causes crystalization and the wire will break without warning, whereas in the case of wire rope it will always give a warning before breaking altogether by one or two strands breaking first.

THE TWO-SEATER HEINRICH MONOPLANE

By W. H. PHIPPS

While America is admittedly behind in the manufacture of monoplanes, it is due, we feel sure, through no lack of constructional skill and designing ability on the part of American builders, but rather through the fact that monoplanes have not as yet been accorded the same favor here as abroad.

That our American designers are fully equal to the task is apparent from a study of the accompanying drawings of the monoplane designed by Albert Heinrich, which is undoubtedly the equal in design of any foreign machine so far constructed, and in many respects is considerably in advance of some of the most successful.

Glancing at the drawings, it will be noticed that the new Heinrich monoplane is of an improved type, which has incorporated in its design most of the latest ideas in both monoplane and biplane practice. In this respect attention is called to the shape and position of the main planes, which have their greatest breadth at the rear and are attached fairly low down on the fuselage and swept back similar to the Fokker, thereby greatly adding to the stability and control of the machine as pointed out in a recent article on the Fokker monoplane which appeared in the January number of AIRCRAFT.

The fuselage is of the now common blunt nose type similar to the Nieuport, but with the important difference that it is not so deep and is of a better stream-line form. It is amply deep enough to shelter the two occupants, who sit well up in front side by side, where they can see right over the front edge of the wings while at the same time they can look downward through openings cut in the main wings.

Turning now to the description of the machine itself, the general dimensions are as follows: Total span, 35 ft. 3 ins.; total length, 25 ft. 6 ins.; chord, 6 ft. 6 ins.; angle of incidence, 5 degrees; length of each wing, 16 ft.; width of fuselage where wings attach, 3 ft. 3 ins.; power plant, 80 H. P. Gnôme, 80 H. P. Gyro, or 60 H. P. Anzani.

WINGS.

The wings have a spread of 16 ft., chord of 6 ft. 6 ins., angle of incidence 5 degrees; each wing is built up on two ash spars, the front one being 14 ft. long, 1¼ ins. thick and 4 ins. deep, while the rear warping spar measures 16 ft. by 1¼ ins. by 3 ins. The front edge spar is of spruce and measures along the straight part of the front edge 1½ ins. by 2 ins. by 10 ft., with the curved end made up of four-ply laminated spruce. The rear edge of the wing is made of a four-ply laminated spruce strip 15 ft. 6 ins. long by 1¼ ins. wide and ¾ ins. thick. The ribs, which are spaced 9 ins. apart, are made with top and bottom battens one inch wide by ¼ inch thick, with a central spacing webbing of wood ¼ inch thick. The planes are covered on both sides with fine quality unbleached linen coated with Naiad aero varnish, which gives them a glass-like finish. Each wing is guyed by twelve stranded steel Roebling cables, six above and six below, and as these cables are all 3-16 inch diameter on top and ¼ in. diameter on bottom, there is a great margin of safety in the bracing of the wings. The top pylon mast is built up of oval steel tubing, the two vertical central tubes being two feet long by 3 ins. wide by 1½ ins. thick, while the two diagonal bracing tubes are stock 1½ ins. oval tubes. This pylon is fitted with a casting on top which rigidly anchors the front top wires while the rear warping wires slid through tubes let into this fitting and are oiled by a grease cup shown in the drawings. The wings are supported beneath by ¼ in. Roebling steel wire running to the front skid struts and 3-16 in. Roebling cables in the rear running to the warping pulleys on the rear of the skids.

FUSELAGE.

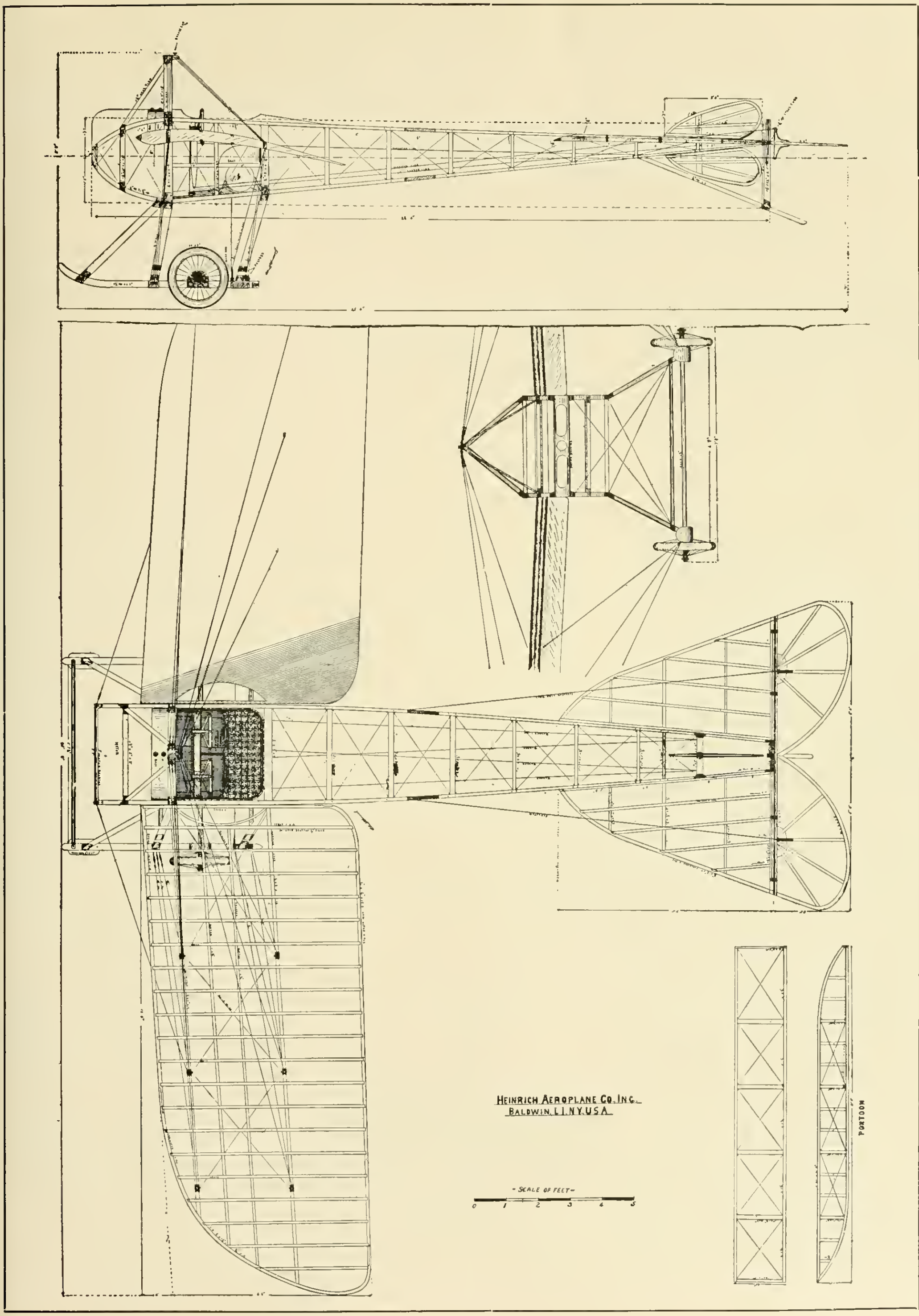
The fuselage measures 22 ft. in length, with a greatest depth of 2 ft. 9 ins., not counting in the engine cowl. It is built up of spruce and ash reinforced at the nose. The main longitudinals measure 1½ ins. square in front, tapering to ¾ ins. square in the rear. From the back of the aviator's seat, however, they are made of 1½ by 1½ ins. spruce, fish shaped, and are fastened every 2 ft. apart by Blériot type U bolts. The two front main uprights which take the main wing measure 1½ by 3 ins.

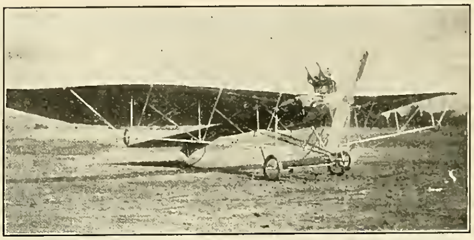
THE TAIL.

The tail is built up in two pieces and has a good size central main spar which butts into a steel tube let into the chassis which supports it in the centre while its front and rear ends are fastened by steel plate attachments. The ribbing of the tail is built up similar to the ribs in the main planes. The elevators are of fan shape and each measure 5 ft. wide by 2 ft. 6 ins. long.

LANDING CHASSIS.

The landing chassis is very simple and at the same time extremely robust, two 24 x 3 in. wheels only are used and these are fastened down Hanriot fashion with very simple rubber shock absorbers.


HEINRICH AEROPLANE CO. INC.
BALDWIN, L.I. N.Y. U.S.A.
SCALE OF FEET
0 1 2 3 4 5
PONTOON



The Goedecker monoplane, an interesting German machine in which, like most of the German constructors, the builder has sought to obtain inherent stability through the shape of the wings. Note the substantial landing chassis and steel tube bracing under the wings.

FOREIGN NEWS

BY

Arthur V. Prescott

Argentine

On March 28th Janoir tested an 80 H. P. Deperdussin monoque ordered by the Argentine government. The machine climbed 3,500 feet in three minutes and attained a speed of 150 k. p. h.

Belgium

Combrez, a French aviator, attained a speed of 114 miles an hour during a flight from Rheims to Tournai on March 29.

Brazil

PRESIDENT FLIES IN CURTISS.

President Hermes da Fonseca on April 15th made a flight over Rio Bay in a Curtiss hydroaeroplane guided by Mr. McCullough.

China

A number of Caudron biplanes built for the order of the Chinese government were recently tested at Issy and the Chinese officials present showed considerable enthusiasm for the new art and expressed their satisfaction of the excellent performances of the machines.

Denmark

The Danish military authorities following a visit to Lieut. Ramm and Mosing to France have purchased a Henry Farman and a Maurice Farman biplane. The Danish Army thus has four French machines at its disposal.

England

$50,000 FOR FLIGHT ACROSS ATLANTIC.

The *Daily Mail* on March 31 announced the offer of a prize of $50,000 to the first person making a transatlantic flight in a hydroaeroplane in 72 consecutive hours between any point in the United States, Canada, and Newfoundland, and any point in Great Britain or Ireland, in any direction. The contest is open to all nationalities.

In addition to this prize the *Daily Mail* also offers a prize of $25,000 for the first person piloting a hydroaeroplane of British invention and construction around England, Scotland and Wales in 72 hours.

GUSTAV HAMEL FLIES CHANNEL OVER AND BACK WITHOUT A STOP.

On April 11th a new cross channel flying record was made by Gustav Hamel, who with a passenger flew on his Blériot from Dover to Dunkirk and back a distance of 124 miles in 1¾ hours without a stop. Mr. Hamel, who is England's hope in the Gordon Bennett Aviation race this year, has now crossed the English Channel no less than thirteen times.

HAMEL FLIES 245 MILES WITH PASSENGER OVER FIVE COUNTRIES.

On April 17th Gustav Hamel made a record flight from England to Germany. He flew with a passenger from Dover to Cologne without a stop, covering the 245 miles in 245 minutes, passing over five countries. The flight was organized by "The Standard" (London) and was made in an 80 H. P. Blériot monoplane with a member of the Standard staff as passenger. "The Standard" organized the flight in connection with the Imperial Air Fleet Committee, of which Lord Desborough is President, with the object of demonstrating the enormous value and importance of aeroplanes.

GRAHAME-WHITE'S SCHEME.

Mr. C. Grahame-White recently stated that he had placed before the Government a comprehensive scheme for putting aviation in England in a sound condition at small cost. In company with a group of financiers he had undertaken to produce the sum of $10,000,000 to be devoted to the establishment of aerodromes in all the big cities, the purchase of hydro-aeroplanes, and the construction of dirigibles. The organization, he added, was prepared to train yearly 500 pilots for the army and 500 for the navy. The Government was considering the scheme.

PROPOSED EXPENDITURES.

As an appendix to the Memorial addressed by the Aerial Defence Committee of the Navy League to the Prime Minister, the following schedule of suggested expenditure has been issued.

ARMY.	
Aeroplanes of latest and most efficient type to equip the five squadrons of the Military Wing R.F.C. allowed for in the Estimates, and provide adequate reserves in the ratio of 1 to 1. (120.)	$600,000
Transport for five squadrons (15 flights)	600,000
Squadron headquarters for five squadrons, with Barracks, Workshops, Sheds, and Garages	1.250,000
Workshop Depot (Lines of Communication)	125,000
NAVY.	
Four large rigid dirigibles (experimental)	1,000,000
Three double Sheds for same	750,000
Hydrogen Plant for three Stations	300,000
Hydro-aeroplanes (experimental), 75	500,000
Royal Aircraft Factory—(Experiments only)	500.000
Land—(Purchase of five landing grounds of 200 acres each)	150,000
Civilian Aerodromes—(Two double sheds for R.F.C. at each of six private aerodromes)	30,000
Total	$5,805,000

France

1,492 MILES IN SPHERICAL BALLOON.

A new world's record for distance in a spherical balloon has been made by Mr. Rene Rumpelmayer accompanied by Mlle. Goldsmith who completed on March 24 a successful trip from Paris to a point near Kharkov, European Russia, a distance of about 1,492 miles.

ZEPPELIN LANDS IN FRANCE.

On April 3 the German Zeppelin airship undergoing military tests lost its way during an altitude test and landed at Luneville, France.

The incident caused quite a little excitement but after a satisfactory explanation by the German officers on board and after replenishing fuel and gas the big airship was allowed to proceed on its way the next day and reached Metz in Germany at 3 o'clock in the afternoon.

THE A. C. F. CRITERIUN PRIZE.

Although the Aero Club of France Criteriun Prize of $2,000 will again be awarded this year for the longest flight without landing, conditions will be different from last year as the competitors will be required to cover the first one thousand kilometers over an out and home cross country course. They may then continue their flight over a closed circuit above an aerodrome and only completed circuits will be counted. Each competitor must carry at least two sealed barographs and one record must be complete or the flight will not be recognized.

Gilbert and Mouthier, two Morane-Saulnier pilots, and Letort, on a Farman, have been making splendid flights at Lyon and Amberieu recently. All three machines are fitted with Rhone rotary motors. On one occasion Gilbert climbed 4,000 metres in 14 minutes while Letort carried passengers above the Alps.

FLIES AT RATE OF 93 MILES AN HOUR IN 318 MILE JOURNEY.

On March 28th Eugene Gilbert flew from Paris to Lyons in a monoplane, a distance of 318 miles, at an average speed of 93 miles an hour.

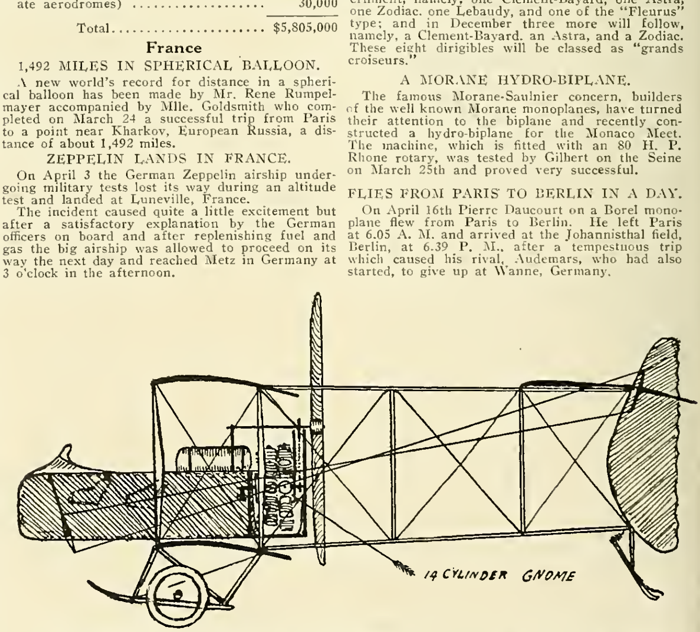
In November of this year five dirigibles of 20,000 cubic metres capacity will be delivered to the Government, namely, one Clement-Bayard, one Astra, one Zodiac, one Lebaudy, and one of the "Fleurus" type; and in December three more will follow, namely, a Clement-Bayard, an Astra, and a Zodiac. These eight dirigibles will be classed as "grands croiseurs."

A MORANE HYDRO-BIPLANE.

The famous Morane-Saulnier concern, builders of the well known Morane monoplanes, have turned their attention to the biplane and recently constructed a hydro-biplane for the Monaco Meet. The machine, which is fitted with an 80 H. P. Rhone rotary, was tested by Gilbert on the Seine on March 25th and proved very successful.

FLIES FROM PARIS TO BERLIN IN A DAY.

On April 16th Pierre Daucourt on a Borel monoplane flew from Paris to Berlin. He left Paris at 6.05 A. M. and arrived at the Johannisthal field, Berlin, at 6.39 P. M., after a tempestuous trip which caused his rival, Audemars, who had also started, to give up at Wanne, Germany.



Diagramatic side view of the latest Farman biplane, which is fitted with 14-cylinder 160 H. P. motor, driving a large central propeller by chain. A machine of this type, but fitted with pontoons and a slightly different shaped tail, was used in the Monaco hydro meet.

PREVOST WINS SCHNEIDER CUP AT MONACO.

On April 16th, at Monaco, Maurice Prevost won the Schneider Cup for hydro-aeroplanes, which carries with it a prize of $5,000.

The other starters were Roland Garros, Gabriel Espanet and Charles T. Weymann, the American.

The machines used by Garros and Espanet developed defects early in the race and returned to the starting point.

Weymann, when he had arrived near the finish of the 150-knot course, was obliged to retire on account of motor trouble. He entered the contest as representing the United States, although he was driving a French water-aeroplane.

Prevost infringed one of the rules of the race at the finish, and when told of it he returned to the course and finished according to the regulations.

Germany

By Stella Bloch.

$37,500,000 FOR GERMAN AIR FLEET.

The German Admiralty's project for the establishment of a big aerial navy was published recently. The fleet of airships and aeroplanes is to cost $12,500,000, which is to be spread over the next five years. The fleet is to be entirely apart from that connected with the army, on which nearly $25,000,000 is to be spent.

A bill providing for the appropriation of $2,750,000 as the first outlay on the Admiralty's aerial fleet was introduced into the Imperial Parliament. It calls for ten naval dirigibles of the largest size, of which eight are to compose the active fleet and two to be held in reserve. Fifty-four double revolving balloon halls into which the dirigibles will be able to enter regardless of the weather are to be erected and another two to be kept as a reserve. Fifty aeroplanes, of which thirty-six are to form the active fleet and fourteen, the reserve. are also to be built for the Navy, and these are to be manned by a special corps of 1,452 officers and men.

The appropriations for this fleet to be spread over the years 1914 to 1918 comprise $8,750,000 for dirigibles and $2,250,000 for aeroplanes, while $1,500,000 is asked for in connection with the pay and maintenance of the crews.

MORE EFFICIENT HANGARS DEMANDED.

The demand for proper hangars has grown imperative, and is voiced throughout the Empire. The Oos hangar was useless, for a landing there would have been impossible in a heavy wind.

The only reversible hangar is that being built by the Navy, but that is regarded as an expensive experiment.

What the public, represented by the newspapers, demands, are hangars allowing an entrance to be made on all sides and capable of housing not one or two permanent vessels, but at least three—hangars of a round type, for what is the good of the constant huge expenditure in building aerial cruisers when the constant catastrophes, most of which could have been avoided had properly-constructed hangars been within reach, all point to a shortcoming, which, should it not be remedied, cripples the entire aim of the movement?

Of the sixteen Zeppelins built up to now, eight have been destroyed, viz., "L. Z. 2," on January 16th, 1906, in the Algäu; "L. Z. 4," on August 5th, 1908, at Echterdingen; "L. Z. 5," on April 25th, 1910, at Weilburg; "L. Z. 7" (Deutschland), on June 28th, 1910, in the Teutoburger Forest; "L. Z. 6" was burnt in its hangar on September 14th, 1910, at Baden-Oos; "L. Z. 8" was fractured at the Dusseldorf hangar on May 26th, 1911, and was replaced by the "Schwaben"; "L. Z. 10" was destroyed by fire on June 28th, 1912, in Dusseldorf. And to these must be added the destruction of the "Ersatz Z. 1" at Karlsruhe on March 19th.

WORLD'S RECORD NON-STOP FLIGHT WITH A PASSENGER.

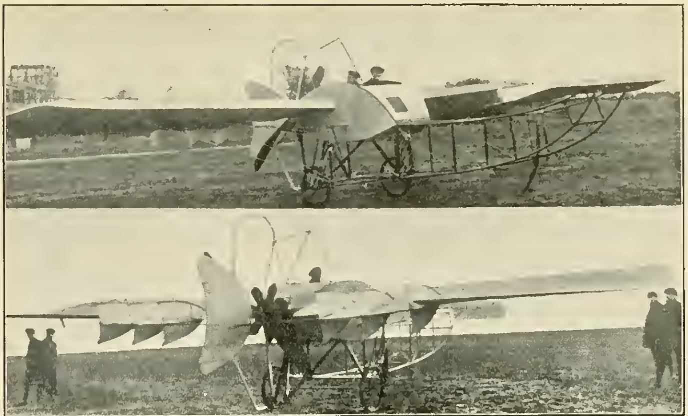
On March 31st Lieuts. Canter and Boehmer, of the German Army, made a non-stop flight of 372 miles, starting from Juterberg and flying to Ploen, by way of Berlin and Lubeck. The flight occupied six hours and nine minutes, making a world's record long distance flight with a passenger.

BAN ON AVIATION NEWS.

A semi-official appeal to the German newspapers to refrain in the future from publishing news as to the voyage and evolutions of German military airships was published in the Norddeutsche Allgemeine Zeitung on April 2nd. They are asked not to record the advances made in aviation and not to report bomb throwing and machine gun experiments carried out by military aviators. They are also requested to maintain silence generally as to developments in German military armament and equipment. Which all goes to show that Germany does not want the rest of the world to realize what a tremendous lead she has attained over all other countries of the world in air transportation.

We learn that an 80 H. P. eight cylinder Curtis hydro-aeroplane is to be added to the machines possessed by the naval aviation station at Wilhelmshaven. Another new purchase will be a Euler triplane with a 70 H. P. Gnôme motor.

The participation of Zeppelin dirigibles will be a feature of this year's Prince Henry Flight, known formerly as the Upper Rhenian Circuit.



Two views of the latest Blériot-Canard war plane. The top picture shows a front and side view of the new machine, which, as will be noticed, is something quite different from the usual Blériot design. For bomb dropping work, the passenger lies flat in the body with his head and arms sticking through the observation window, where he is permitted an unrestricted view of the ground below. The bottom picture shows a rear view of the same machine and illustrates the peculiar arrangement of the rudders and stabilizing fins at the rear. The motor, as can be seen, is mounted at the extreme rear of the body and the wings are fitted with large ailerons instead of the usual warping arrangement. The front plane consists of a small stationary lifting surface with inversely curved elevator flaps attached to its rear edge.

It is known to all that the British Government is having a Parseval airship of 86 metres in length and 15 metres at its widest point built at Bitterfield at a cost of 550,000 marks ($137,000). Pending negotiations were concluded in the first week of March to the effect that all the designs and plans of the dirigible were to be delivered to England with the vessel itself. England possesses the right to build as many dirigibles of this type as it pleases during a certain number of years, paying the works at Bitterfield a sum set down in the agreement for each cruiser. This arrangement has received the sanction of the German officials.

The testing of the new Zeppelin cruiser "L. Z. 16" was finished on March 15th with a machine gun practice with ball cartridges, in the course of which 500 shots were fired, the exactitude and easy adjustability of the apparatus causing general satisfaction. The vessel will be listed as "Z IV." in the military fleet and be stationed at Koenigsberg, near the Russian frontier.

A new German duration record of 6 hours and 2 minutes, without a passenger, was set up on March 14th by the Wright juvenile pilot, Sedelmayer, who steered a 55 H. P. Mercedes motored biplane. This fine performance, accomplished in rain and heavy winds, brought Sedelmayer a grant of 6,000 marks from the National Aviation Fund and a monthly income of 2,000 marks, payable until January 1st, unless his record is beaten before then, when the income goes to the next holder.

The terrible accident that befell the "Ersatz Z I," the handsome new military Zeppelin, on March 19th, has robbed the army of one of its swiftest aerial cruisers, a vessel most popular in South Germany, with a long list of fine performances to its name. Stationed at Baden-Oos, "Ersatz Z I," returning from a twenty-hour trip, was compelled, owing to shortage of fuel, to come to anchor outside Karlsruhe in a terrible storm. A sudden gust of wind forced the nose of the vessel down to the ground, and, uptilting the rear, suddenly rent it in two. The crew was just able to escape before the worst happened. In the course of the evening the storm played further havoc with the cruiser and broke it up completely. The vessel was built to replace the old "Z I," which is being dismantled at Metz after a long and useful career, as even with all the improvements made it could not fulfill present day requirements.

Italy

On March 11 Widmer, who has twice flown from Trieste to Venice on his Blériot, started from the latter place for Rome and after flying for 1 hr. 40 mins. got to Ravenne and later in the day went on to Ancome, thus completing the first stage of 300 kilometres.

MORE BLERIOTS FOR ITALIAN ARMY.

The Blériot pilot Perreyon while at Mirafiori recently tested some Blériot monoplanes for the Italian government during the course of which he made a flight of 3 hrs. duration.

ITALIAN BATTLESHIP FITTED WITH AMERICAN FLYING BOAT.

Italy has the distinction of being the first nation to make the hydroaeroplane part of the regular equipment of her naval vessels. The Italian warship San Marco, which has been sent to Turkish waters, is equipped with one of the Curtiss hydroaeroplanes recently purchased by the Italian government. Commander de Filippi, who has been largely responsible for the development of naval aviation in Italy, has been appointed pilot of the machine. The fact that an American flying boat was chosen is causing much comment in European naval and aviation circles.

Japan

With a view to encouraging aviation the Japanese Government has issued a decree granting pensions to amateur and professional aviators injured while flying, and grants will be made to the families of aviators killed while flying. Bonuses also will be given for each meritorious flight accomplished.

Mexico.

Señor Enrico Olarte, the Mexican Chargé d'Affairs, has received at the Mexican Legation in Paris thirty-one pupils from the military school at Tlalpam who have come to France to go through a course of military aviation. So do revolutionary countries keep pace with the evolution of warfare.

Spain

On March 26 Colonel Vives Y. Vich was at Villacoublay to officially take delivery of three 80 H. P. Nieuports for the Spanish Army. With Gobet as pilot the machines easily carried out the specified tests including altitude climbs and landings on ploughed land. One of the machines was dismantled in 11 mins. 35 secs. and was re-erected ready for flight in 20 mins.

Switzerland

On March 11 Bider, the young Swiss Blériot pilot who recently made an astonishing flight from Pau to Madrid flew in Switzerland with his brother from Bale to Berne in 50 minutes. He afterwards carried a number of prominent persons for flights on his Blériot. Audemars made a try for the Swiss height record but after mounting 3,500 feet in 10 minutes found the wind too strong and gave up the attempt.

Turkey

Enver Bey, the military hope of the Young Turks, recently made a prolonged reconnaissance of the Chatalja lines as a passenger on an aeroplane, piloted by a German aviator. So enters the new régime into the scheme of things military.

The Ministry of War has just ordered thirty-three aeroplanes from different German firms. When these machines are delivered it will mean that Turkey will then have an air fleet of about fifty aeroplanes or about twice as many as the United States Government now possesses.

Of the few victories which the Turks have won in the Balkan war that of March 19, which was won entirely through the excellent work of two Turkish aeroplanes, was one of the most decisive. Throughout the battle two Turkish aeroplanes flew over the scene of the fighting reconnoitering the Bulgarian positions and signalling all the movements of the enemy to the Turkish commanders.

War Department and Scientific American Accepts Aircraft's Figures as Authentic

In the March, 1913, Aircraft, page 8, we published an estimate on the total expenditures of the different governments of the world for aeronautical work during five years and the approximate number of aeroplanes and dirigibles either owned or ordered. To compile such a table properly required the knowledge of one who had been in constant touch with the entire aeronautical situation during the past five years and also an expenditure of several months' time in careful research work as well. It was no easy task, and the Editor of Aircraft, who did the work, feels complimented to some extent by knowing that his figures were accepted by practically the entire aeronautical movement throughout the world, as authentic.

Although the figures were given approximately, their accuracy can be gauged when it is seen in our table that England was credited with having 100 aeroplanes, and then within three weeks after the publication of the table, Col. Seely, the Secretary of State for War, stated in the House of Parliament that although it had been kept a secret previously, Great Britain actually owned 101 aeroplanes, or just one more than the number published in the March number of Aircraft.

This magazine, therefore, was the first to announce, in England as well as in other countries, the approximately correct number of machines which their various governments possessed.

By comparing the figures in the extracts below with the table on page 8, March number of Aircraft, it will be noticed that "a prophet in his own country" is not always ignored.

From Scientific American
april 12 1913

... cities such as Portland, Me., or Bos... Mass., and return across the Atlantic without replenishment of fuel. It would be an easy matter, however, to have warships convoy the airships and carry the necessary supplies of fuel and ammunition. The refueling of a Zeppelin from a collier has been accomplished several times in the North Sea without any difficulty.

Now that both the army and navy of the German Empire have ordered twenty huge Zeppelins and ten Schutte-Lanz dirigibles, it would be well for Congress to consider whether it would not be wise to undertake the construction of a dirigible of large size for experimental work, and make a generous appropriation for an up-to-date aeroplane fleet. During the last five years Germany, France and Russia have spent \$28,000,000, \$22,000,000, and \$12,000,000 in the order named for aeronautics. Italy, Austria, and England have spent eight, five, and three millions; Belgium, two; Japan, one and one half; and Spain, \$550,000, whereas in the United States of America, only \$435,000 has been expended, and we have to-day less than a score of aeroplanes and one out-of-date dirigible, as against the large and efficient fleets owned, respectively, by France and Germany.

From New York Times
april 15 1913

... the quest... will continue to support the claim... the Cuban Central Railway, which is owned by a British corporation.

GERMANY RULES THE AIR.

Leads World in Aerial War Craft—United States Is Fourteenth.

WASHINGTON, April 14.—The United States stands fourteenth among the Nations of the world in number of Government-owned aeroplanes and in Government expenditures for aerial navigation in the last five years.

Figures compiled under the direction of Brig. Gen. Scriven, chief signal officer of the army, show that Germany leads the world with 400 aeroplanes and a total expenditure of \$28,000,000. The United States at present owns 28 aeroplanes and its expenditure amounts to \$435,000.

Other countries rank the United States in aeronautics in the following order: France, Russia, Italy and Austria, Great Britain, Belgium, Japan, Chile, Bulgaria, Greece, Spain, and Brazil.

NEWS IN GENERAL

By D. E. BALL

The Great Lakes Reliability Cruise

An air boat tour from Chicago to Detroit and return with various stopping points en route is now planned by Chicago aeronautical enthusiasts under the general leadership of E. Percy Noel, which, if finally brought about, will be known as the Great Lakes Reliability Cruise, and is scheduled to take place in July.

Tom Benoist has notified Aircraft that the Benoist Company is building three of the latest type Benoist Flying Boats, to be entered in the tour, and it is also understood that the Weckler-Armstrong-Lillie Company of Chicago will enter one or more of their new tandem type monoairboats in case they are ready for work by that time.

The first annual banquet of the Pacific Aero Club, which was held at the Bellevue Hotel, San Francisco, on April 5th, was a big success, and the guests present were very enthusiastic over the outlook for aviation affairs on the coast during the coming season.

Mr. Harold F. McCormick to Use a Flying Boat for His Daily Travel Between Home and Office

Harold F. McCormick, son-in-law of John D. Rockefeller, has bought a Curtiss flying boat and will use the machine for daily travel between his office in Chicago and his home at Forest Lake, twenty-five miles away. He expects by its use to reduce by one-half the time spent in travelling between his home and office, as well as to find in it a new and exciting sport.

Thousands of miles have been travelled in flying boats both here and abroad, but to date none have been involved in any serious accidents.

Combining the speed and comfort of an aeroplane with the safety of a motor boat, with the disadvantages of neither, the McCormick boat will be twenty-six feet long, have seating arrangements for four persons and wings spreading forty feet. The passengers will be protected from wind and spray by a collapsible shield. Power will be provided by one of the new Curtiss 85-horse power motors, and the travel radius will be nearly 400 miles.

It is expected that Mr. McCormick will enter the craft in the hydro-aeroplane races to be held this summer by the Aero Club of Illinois.

Brucker Transatlantic Fiasco.

Dissension among the members of the Brucker-Gans-Suchard transatlantic expedition having been responsible for the discontinuance of the plans to cross the ocean in a dirigible, Mr. Joseph Brucker, the originator of the plans, built a spherical balloon of 7,250 cubic metres in which he intended to endeavor to make the flight from the Canary Islands to the American Continent with the aid of the trade winds, but just as all preparations had been completed for the flight, at daybreak on the morning of April 16th, through the loss of gas and inability to secure a supply at that point, Mr. Brucker decided to postpone the voyage indefinitely.

Hempstead Field

At the Boland school the 60 H. P. tailless Boland biplane shown at the recent Sportsman's Show was given its initial flight on March 30th by Horace Kemmerle, who is to be the chief pilot at the school. This interesting biplane, scale drawings and a description of which we publish in this issue, shows a considerable range of speed and Kemmerle declared himself as delighted by the way it flies and the ease with which it handles.

At the Hempstead Field during the past month Henry St. Yves. the former French marathon runner, has been making a number of flights and is rapidly becoming one of the most skilful aviators at the field. He recently made a cross country flight over the surrounding neighborhood, passing over the County Jail and giving the prisoners in the yards a treat.

The novel Spainhour monoplane which, as recorded, was wrecked by a collision with the Walden monoplane last year, has now been rebuilt and should soon be out for trials. The machine has balanced rocking wings attached to the framework through the medium of springs so that they can give when struck by gusts. They are. however, at the same time capable of being worked for balancing and turning purposes. Another occupant of the same hangar with the Spainhour machine is the large Beckwith-Crabtree tractor biplane which is equipped with a Maximotor. This large machine has been making a number of creditable flights.

Frederick C. Hild is also keeping up his practice on his Blériot type monoplane and has made a number of trips.

Dominguez Field

At the Sloane School, Martin has made rapid progress and by the time this appears should have received his license, while Hoshino is about ready to take his. Pedlington. of Montreal, Canada, has been doing ground work and should soon be ready for straight flying. Miss Margaret Stahl has finished her ground work and is now making straight away flights and should soon be making turns. Apperman, Kanaya, Allan and Haskins are other pupils who are progressing well.

In addition to the regular work of teaching, instructors Bonney and Gilpatrick have indulged in several exhibition and cross country trips and Bonney recently made a long flight with Miss Stahl as passenger.

Los Angeles

Two pontoons have been shipped by Charles Day to J. Milton Bryant flying for the Bennett Aero Company, where they will be used in over water flying exhibitions fitted to Bryant's 80 H. P. single screw tractor. Miss Alys H. McKey will accompany Bryant on his exhibition tour beginning at Seattle and will fly a Bennett type biplane driven by a 60 H. P. Curtiss motor. She has been taught flying by Bryant and handles a machine perfectly so that Bryant had no hesitation in booking her on his tour.

St. Louis, Mo.

The Benoist Aircraft Company has been conducting a water flying school at Creve Cour Lake since the rise of the Mississippi has reached such a stage that it was dangerous to keep the machines there.

William H. Blakeley, instructor of the Benoist land school at Kinloch, flew over to Crevè Coeur with one of the pupils on April 3 to take part in the water flying that was going on. In flying back late in the evening he was overtaken by darkness and compelled to land in a wheat field. Starting the next day for Kinloch he was caught in a driving rain which came down so thick that he could not see the ground and flew right straight over Kinloch field without knowing it and continuing on some distance where he landed to enquire his bearings. Later in the day, it having cleared up a bit, he was able to fly back to the field successfully.

MOISANT PILOT FLIES FOR PRESIDENT TAFT.

S. S. Jerwan. chief pilot of the Moisant School. who has been making some remarkable flights at Augusta, Ga., recently dropped a letter from his monoplane, addressed to President Taft. Mr. Taft was stopping at the Bon Air Hotel, Augusta, Ga., and Jerwan flew over the hotel, dropping his note intc the hotel grounds. The receipt of the letter was acknowledged by Mr. Taft.

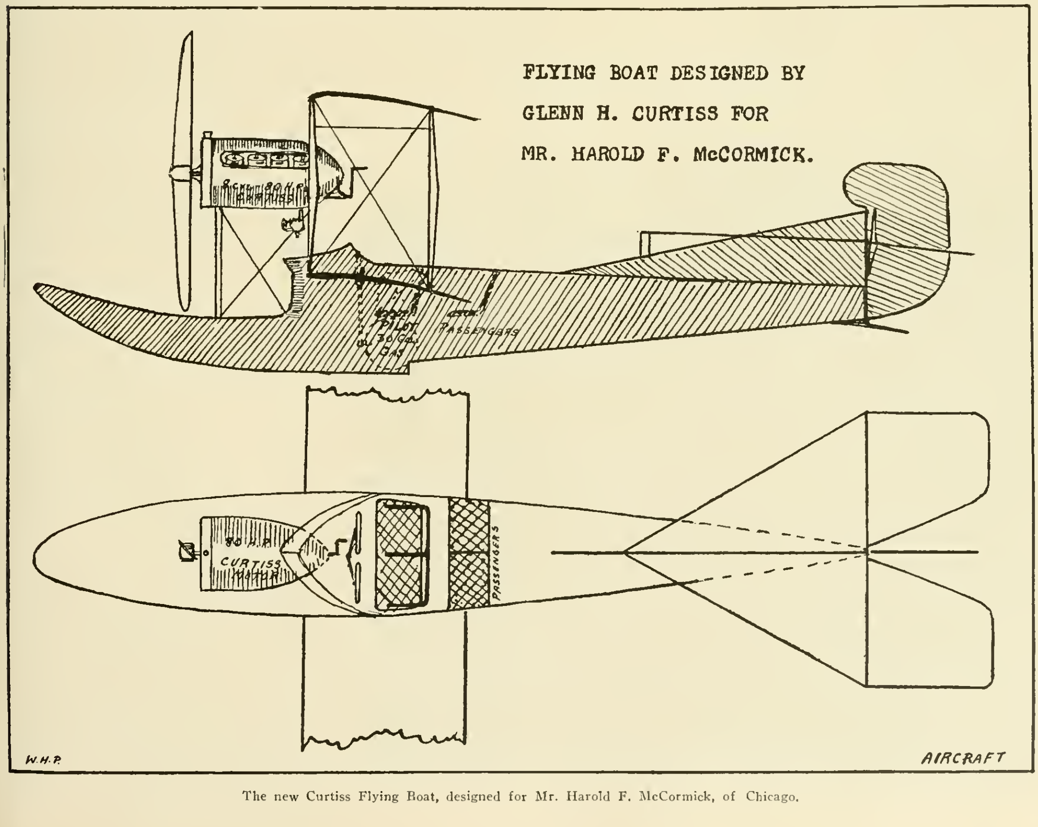
The Kemp Motor

The Kemp Machine Company, of Muncie, Ind., have just placed their first 1913 six-cylinder motor on a series of tests, and they are greatly pleased over the results, which more than came up to their previous expectations. They report a run of 4 hours 40 minutes was made the second time the motor was run on its own power, and the last hour was run on full throttle, pulling a 7-foot diameter propeller of 6-foot pitch at 1,015 r. p. m., and they claim that when the motor is thorougbly adjusted it will develop fully ten per cent. more power. They have already sold three motors during the last month, and have also issued a very interesting catalogue of their latest product.

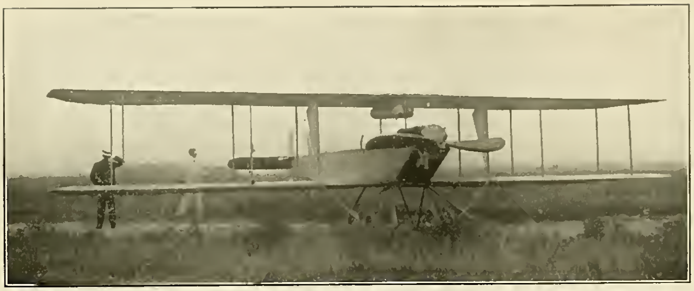
The Aeronautical Society

On April 10 the Aeronautical Society held an interesting discussion on the aspects of the Wright-Curtiss suit and heard plans of different members and others who believed they had controlling devices that were practical and did not infringe on the Wrights. Amongst those who spoke were the President of the Society W. Irving Twombly. Lee S. Burridge, Thomas W. Hill, Christopher J. Lake, Grover Cleveland Leoning, Mr. Barker and William Bouldin, 3d.

At the directors' meeting of the Aeronautical Society on March 20, a resolution was passed which provides that any member having plans for a control, may submit the same to the law committee with the understanding that the committee shall render an opinion upon them and, if the idea is found to be patentable. shall file the claim in the patent office without legal expense to the inventor. This will be of great benefit to inventors who lack funds with which to protect their ideas, and has already resulted in several applications for membership. The plans thus submitted will afterward be turned over to the technical board and, if one of the specifications is considered practicable, it will be adopted and a machine constructed along the lines designated, at once. The expense of building will be defrayed by contributions from a number of members who stand ready to back a practical stabilizer which does not infringe on the Wright patents.



The new Curtiss Flying Boat, designed for Mr. Harold F. McCormick, of Chicago.



The Burgess military tractor with which Lieut. Milling recently established a new American cross-country record and a new American endurance record with a passenger of 4 hrs. 22 mins.

Lieut. Milling With Burgess Tractor Establishes New Records

By F. H. Russell.

Lieut. Milling's flights on March 31 and April 1 with Lieut. Sherman between Texas City and San Antonio, a distance of 236 miles, have established not only a new record for long distance cross country flight, but also a new record for speed with a passenger and for endurance.

His first flight of 236 miles was covered in three hours and twenty minutes at an average speed of a little over 70 miles per hour. After reaching San Antonio he remained in the air another hour and two minutes, establishing a new American endurance with passenger record of four hours and twenty-two minutes.

On his return trip, the day following, the distance was covered with an unfavorable wind in three hours and fifty minutes at an average of 62 miles per hour, giving an average speed for the two trips of 66 miles per hour.

It will be remembered that the Burgess tractor machine was built to conform with the 1912 U. S. Signal Corps specifications for a weight-carrying machine which should have a maximum speed of 45 miles per hour and carry two passengers with sufficient fuel for four hours' flight.

After being exhibited at the New York Aero Show, where it attracted no little attention on account of the fact that it was the first tractor aeroplane with enclosed nacelle built in this country, incorporating all of the advantages of the Wright system of control with the simplicity of a single propeller driven by a reliable motor of reasonable horse power, the aeroplane passed its tests in Marblehead harbor when mounted on hydroplanes soon after its return from New York, meeting every requirement for speed, climbing and weight-carrying without difficulty.

The opinion then prevailed that in order to attain reasonable speed a machine carrying but one person of lighter construction and less flexibility, would be required, and hence the specifications were issued by the Signal Corps and another order placed for a small machine which should have a minimum speed of 65 miles per hour. It was felt, at that time, by many that a large tractor could be built which would not only fill the requirements of a weight-carrying machine with observer, wireless, and full equipment of instruments, but would also attain the speed required in the speed scout type, of 65 miles per hour.

Lieut. Milling's flights above referred to certainly confirm this belief, as while the Burgess tractor is provided with panel sections which can be removed, reducing the wing area about eighty feet and increasing its speed five or six miles an hour, it has been found that it was not necessary to remove these panels to attain a high speed.

Thus in the Burgess tractor the Army has secured and proved to its own satisfaction that the weight-carrying scout machine will fill the requirements of the speed scout and have the advantage of carrying an observer and a large wind area, permitting of safe gliding and landing at reduced speeds.

There is no doubt to-day but that the tractor type of aeroplane as designed by W. Starling Burgess will become the standard in this country for aeroplane efficiency. Any number of similar machines throughout the country have since been built with varying success, and the U. S. Signal Corps' specifications for 1913 are based upon what may be expected of a tractor type when properly designed along the lines of the Burgess tractor, which has given such excellent operators as Lieut. Milling an opportunity to demonstrate that military aviation in this country exceeds to-day any achievement, either for long distance work or endurance, performed by civilian operators and has placed the military flying in this country alongside of that of France and England.

Aviation School receives University's recognition.

Curtiss and Army Affairs

By Lyman J. Seely.

Glenn H. Curtiss has renewed his offer to the Signal Corps to instruct without charge to the government as many men as may be assigned for aviation duty either at North Island, Calif., or at Hammondsport, N. Y.

Mr. Curtiss' principal reason for making the offer at this time is the realization that. instead of one man to a machine, at least three or four aviators and trained observers will be required for each machine if constant efficiency is to be maintained. Recent reports from Europe on the experience gained in the Balkan war and during the military manoeuvers in England and France show that at least four men to a machine are deemed necessary while on active service.

Uncle Sam's cash appropriation for military aviation is very modest (see Aircraft, Vol. IV, No. 1, page 8). But what Uncle Sam asks for his mite is far from modest (see Aircraft, Vol. IV, No. 1, page 18). Compared with other nations—using expenditures as a basis—we stand fourteenth in the list, giving place to Spain, Greece, Bulgaria, Brazil and Chili. Having done less than any other world power to help develop military or practical aviation, we ask our two or three aero manufacturers to give us more than any other country has so far been able to produce. The recently issued specifications for new U. S. military aeroplanes demand a greatly increased speed range, more equipment. armor plate, more horse power, etc. Some of the requirements have not been equalled in any country; few of them in America. Robert Fulton might almost as well have been asked to make his second boat a Mauretania. An amusing feature of the situation is, we should have to whistle for the new machines but for the fact that foreign governments have given more support to American aeroplane manufacturers than our own government. Glenn Curtiss has built more machines for each of half a dozen foreign powers than have been purchased by the United States. With the experience thus gained our manufacturers may be able to meet the demands of our army officials.

After a hearing in U. S. District Court Judge Hazel fixed the bond for the appeal in the Wright-Curtiss aeroplane patent suit in the sum of $10,000. Edmund Wetmore, counsel for the Wright Company, objected to the amount of the bond, urging that the earnings of the Curtiss Aeroplane Company had been very large.

Judge Hazel, in setting the amount at $10,000, said that he felt Mr. Curtiss' contributions to the cause of aviation during the past few years had been very great, and he did not wish to fix the bond in an amount that might embarrass Mr. Curtiss' work.

Glenn Curtiss was present at the hearing, and expressed his confidence in the outcome of the appeal and at the same time his surprise at the interpretation given in America to the patent decisions in Germany and France. Recent cable reports, he said, gave the impression that the Wrights had won sweeping decisions in the European courts, whereas, he pointed out, the German decisions uphold the Wright claims for the use, in combination, of the wing warp and vertical rudder, but refuse the claims on these devices working independently, and also deny that the Wright patent in any way covers the ailerons (lateral balancing surfaces) as employed by Curtiss. In all the machines now manufactured, including those made by the Wrights, the wing warping and vertical rudder, are used independent of one another.

The general effect of the recent French decision is said to be similar to that of the Germans.

Heinrich School Opened

The Heinrich Brothers, builders of aeroplanes, of Baldwin, Long Island, N. Y., have now opened up their spring school for the summer season. Mr. George A. Page, of Hillsdale, has enrolled as one of the students, and two other students are expected by the first of May. Albert Heinrich, the designer for the Heinrich Brothers, will fly one of their monoplanes on Langley Day, May 6th, at Washington, D. C.

Naiad Aero Varnish Receives Great Praise

In ordering some more aero varnish from the C. E. Conover Company, makers of the Naiad cloths and aero varnish, George W. Beatty, the well known pilot writes as follows: "When speaking of your varnish I can only express myself in the highest terms. The more I use it the better I like it, and certainly believe everyone will feel the same once they try it."

Burgess Tractor With Sturtevant Motor Doing Good Work

Notice has been received at the War Department of several important flights made by the army aviators at their southern winter camps. Lieut. Thomas Milling, in what is known as the Burgess tractor, with Lieut. Sherman as passenger, flew from Galveston to Houston and returned, a total distance of ninety miles, in about an hour and a half. He circled the city of Houston in the course of the flight and passed through two rainstorms.

Lieut. Harry Graham, with Lieut. Call as passenger, flew over approximately the same course in the Burgess machine equipped with a Sturtevant motor. They covered a distance of about eighty miles and passed through one rainstorm in the course of the flight.

Lieut. Kirkland, with Sergt. Idzarik as passenger, started over the same course, but after covering about forty-five miles was compelled to stop on account of the rain.

These two flights, in the face of squalls and rainstorms, are simply additional testimonials to the wonderful reliability of the Sturtevant motors.

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(SEAL) Notary Public 89, N. Y. Co.
(My commission expires March 3, 1914.)
Form 3526. 5-6012.

MODEL DEPARTMENT

By NICHOLAS SCHLOEDER

The Collins Interclub Model Trophy

A series of five interclub contests for a handsome silver trophy, offered by Mr. Francis A. Collins, is now being held at the Rugby Flying Grounds, Brooklyn, by the leading model clubs in the vicinity of New York. The date of the contests are: April 6th, for duration launching from hand; April 21st, for distance launching from hand; May 4th, for duration, rising off ground; May 18th, for distance, rising off ground; May 30th, for duration for hydroaeroplanes.

The contests will be decided on the number of points credited to each club. Twenty points is the highest number attainable by the winning club on each afternoon, making a total of 100 points for the five contests. The highest average of each contest in duration or distance is taken as a basis for determining the number of points that should be credited to the other clubs.

The first of these contests for duration from hand, held on April 6th, was won by the New York Model Aero Club, thus giving them 20 points. The Summit M. A. C. was second with 12.5 points, the Long Island M A. C. next with 5.33 points and the Bay Ridge last with no points, none of their flyers being able to equal the qualifying mark of 60 seconds' duration.

Harry Herzog, of the N. Y. M. A. C., did the best work of the day when his model flew for 112 seconds; J. Billings made 85 seconds, while George A. Page, Jr., made 71 4/5 seconds, giving the team an average of 89 4/5, or higher than the highest officially recorded model flight ever made in England, 89 seconds.

C. Tiffany starred for the Summit Club with a flight of 100 seconds; W. Lauder was second with 67 seconds, while C. Myers did not qualify, giving them an average of 55.66 seconds. Lester Ness was the only one to qualify for the Long Island Club, when his model flew for 71 seconds, resulting in an average of 23.66 seconds.

The conditions for flying were extremely unfavorable owing to the high wind and to frequent snow flurries. This kept the averages low. While no attempts were made at distance, many of the machines approached the half-mile mark.

These contests are notable, as they are the first attempt at interclub competition that has been made in this country. They should materially help the progress of this branch of aeronautics by stimulating the interest in model aviation and showing the great possibility for sport which these little machines offer. Moreover, contests like these serve to bring out club spirit and thus make a club more than a mere name. If clubs in other parts of the country—San Francisco, St. Louis or Chicago, for example—would combine with the New York group the sport would be enormously benefited. If there are no clubs in the vicinity it would be advisable for those interested to come together and form some and hold interclub contests. Five members in a club would be enough. It is not size but efficiency and spirit that counts. It will be a revelation to many to see the amount of entertainment and instruction which can be derived from active model flying, especially in events like these, in which a keen spirit of rivalry adds zest to the contest.

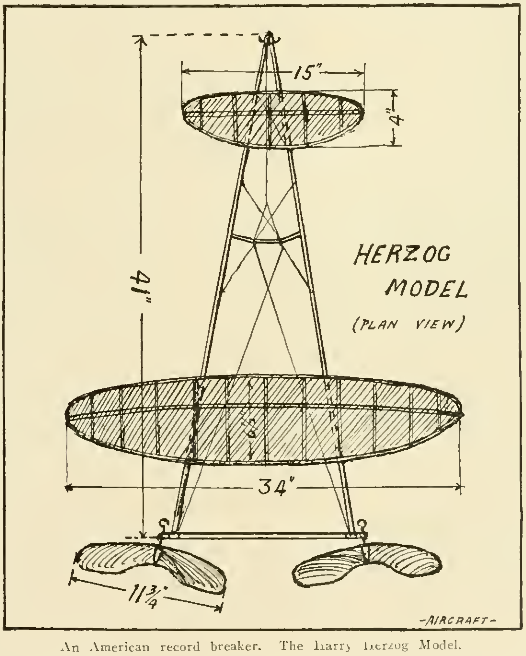
Description of the Herzog Model

The model of Harry Herzog described in this issue is the winner of the interclub contest held on April 6th, with a mark of 112 seconds' duration. The fuselage is 41 inches long and is 5/16 by 1/8 inch spruce, tapering 3/16 by 1/8 inch at the ends. The bracing consists of No. 30 gauge iron wire. The rear piece joining the fuselage and holding the bearing is bamboo. The bearings themselves are of thin piano wire

The construction of the wings is very simple, consisting of a single piece of bamboo, bound, formed into shape and joined by bamboo ribs. A piece of spruce running lengthwise stiffens the plane. Over this frame work is stretched some gold beaters' skin which is tightened by applying to it a thin coating of commercial liquid known as Ambroid varnish. The plane is 34 inches in width and 6½ inches in depth at the centre. The elevator in front measures 15x 4 inches.

The propellers are cut out of white pine, 11¾ inches in diameter, with a pitch of 37 inches. They are driven by 12 strands of ⅛ inch flat rubber at a speed of 300-600 revolutions per minute

The weight of the model is 3⅞ oz. This model represents all the latest tendencies in model constructions, i. e., the slow speed propellers, large surface and vertical as well as horizontal bracing.



An American record breaker. The Harry Herzog Model.

Present Records

The New York Model Aero Club, being the leading organization of its kind in the United States, is now issuing certificates to United States record holders and also certificates of performance cards to those who wish to show what flights they have accomplished. The fee for issuing a record certificate is 10 cents and for a certificate of performance card 5 cents.

The official records for the year 1912, for which certificates have been awarded, are as follows: Distance, rising off the ground, Armour Selley, 1,408 feet; duration, rising off the ground, Curtis Meyers, 73 seconds; duration, rising off water, Armour Selley, 53 seconds; distance, launched from hand, Armour Selley, 2,653 feet; duration, launched from hand, Armour Selley, 158 4/5 seconds.

The following list of English model records should prove interesting, as they show that in one branch at least America is in the lead:

Duration, launching from hand, A. F. Houlberg, 89 seconds; distance, launching from hand, A. E. Wollard, 1,431 feet; distance, rising off ground, C. Rowlands, 696 feet; duration, rising off ground, A. F. Houlberg, 51 seconds; duration, hydroaeroplane, G. B. Beagg Smith, 25 seconds.

For many years England was practically alone in the model world, but America, under the leadership of the New York M. A. C., overtook her in the spring of 1912. Perhaps to that remarkable model flyer from Flatbush, Brooklyn, Armour Selley, more than any other, credit for this is due. Selley has been flying models for the past three years, winning many trophies, cups and other prizes, and undoubtedly deserves the title champion model flyer of the world. His most notable triumph was the winning of the Bamberger contest at Newark, N. J., from 81 contestants. All of his record-holding models are different in construction, each of them having been designed for the particular contest that they were entered. In addition, none of his records are flukes, as he has made many flights, very closely approaching each of his best marks.

Club Notes

Bulletin No. 15.

The New York Model Aero Club has planned to hold a series of monthly contests during the year 1913 on a scientifically imposed basis. Each month there will be one contest, to be known by the name of the month in which it takes place. The prize each month will be a silver cup offered by the club.

The nature of each contest and rules for same will be announced in advance, in order to give the contestants ample time to build special models for the special events.

Entries for each month will be as follows: Members in good standing, free; members in arrears, 10 cents; all non-members, 25 cents.

The Long Island Model Aero Club, which was organized in the fall of 1911, is still in its full vigor. It meets every Friday night at the home of its president, Mr. W. Walker, 200 Railroad avenue, Cypress Hills, L. I. The club is exerting all its strength in an endeavor to win the Collins Interclub trophy. It is to this club that the credit is due for suggesting this kind of competition.

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AERO MOTORS and Motor Cycles—New—Used. Brauner J. Ostergaard, 1830 North Sawyer Avenue, Chicago, Ill.

FOR SALE—Tractor biplane, 42-foot spread, 5-foot chord, double surfaced, Farman running gear, 8-cylinder 60 H. P. motor, Bosch magneto, Schebler carburetor, radiators, combination tank, 8-foot Paragon and Normale propellers, extra parts, tent, crates, complete exhibition outfit; would make fine hydro-aeroplane; will sell without power or power plant separate; price $1,200. F. Robinson, 191 Caledonia Ave., Rochester, N. Y.

BARGAINS—30, 50, 75 horse-power motors, aeroplanes, hydro-aeroplanes; will demonstrate. Patterson, 986 Trumbull, Detroit, Mich.

HEADLESS Curtiss type; has been flying; in crates $500. Address Box 767, AIRCRAFT.

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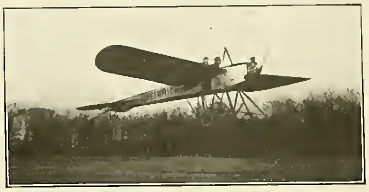

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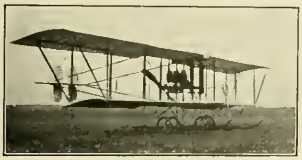

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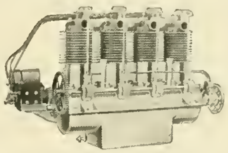

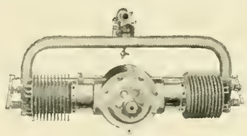

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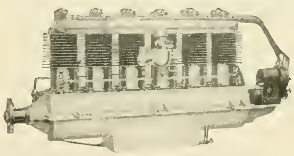

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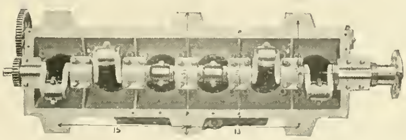

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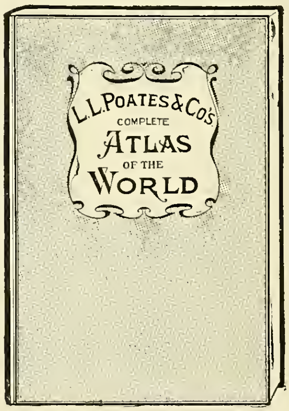

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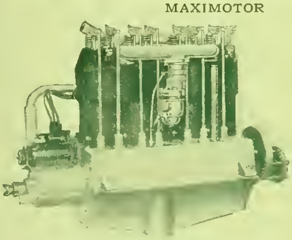

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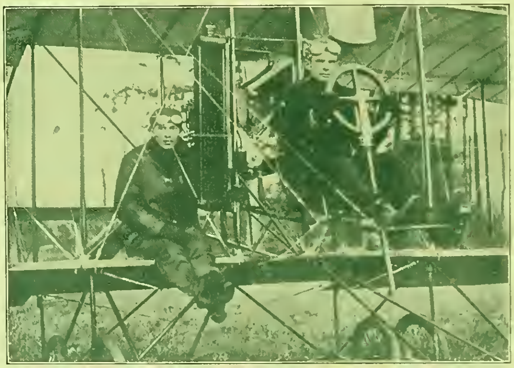

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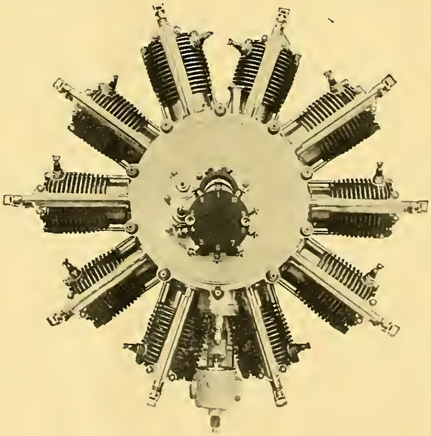

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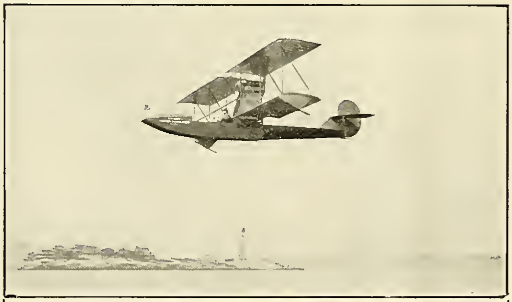

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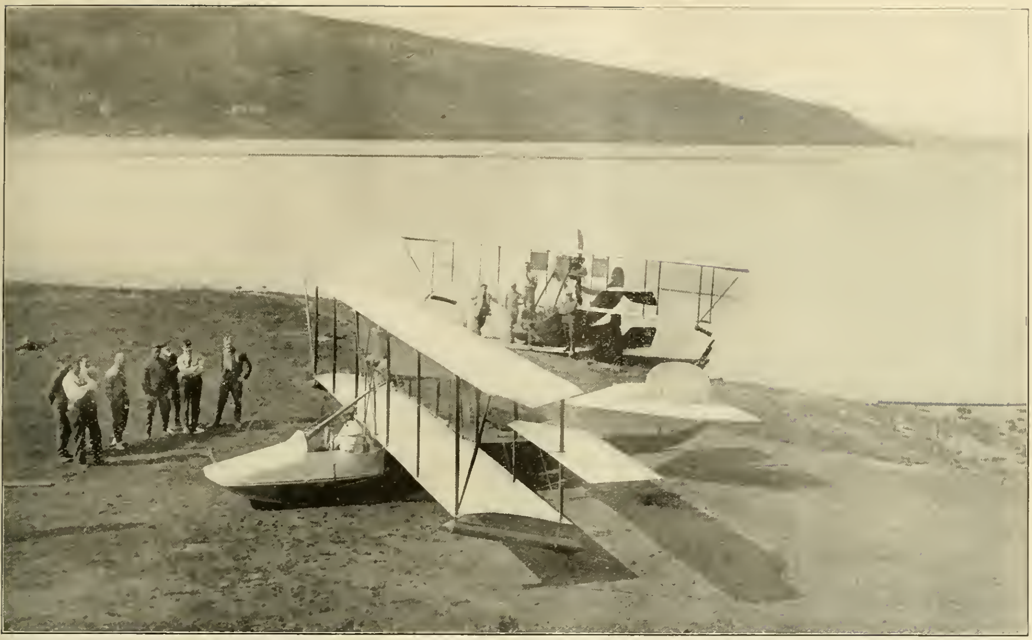

A scene at the Curtiss flying school at Hammondsport, New York, showing two of the latest Curtiss flying boats drawn up on the beach. The machine in the foreground is the latest Curtiss Flying Boat, purchased by Marshall E. Reid, the well-known aviator, who is seen seated in it. The machine in the background is one of the school flying boats with hinged hood, which is used as a gangplank and permits boarding or disembarking at a pier so that there is no longer any need of drawing the machine up on to the land when taking passengers on or off.

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CONGRESS AND AERONAUTICS

By WM. G. SHARP, M. C.

WILLIAM GRAVES SHARP is a member of Congress from Ohio who has been taking a most active part in the introduction of aerial matters into discussions of that august body. From the very first practical demonstration of man's power to navigate the air, Mr. Sharp realized its great importance both from a scientific and industrial standpoint and also that it would become a most useful factor in warfare. Therefore he has been endeavoring during the past two years, to secure the much needed legislation for its promotion in this country. He has an unshakable faith in a great future for air craft both for war and commercial purposes, but thinks that the knowledge gained in the development of air transportation will be but the hand maid of science. In fact, it was his love for the natural sciences, especially that of astronomy, which caused him to become so greatly interested in the subject. The study of astronomy is with him a hobby in which he has spent much time in contemplation of the mysterious properties of that subtle matter filling all interstellar space which we call ether and by which it is believed all solar energy is alone conveyed

PERHAPS the old adage that "necessity is the mother of invention" could not be better exemplified than as it applies to the backwardness of Congress in encouraging aeronautical development by making liberal appropriations therefor. While comparisons in the matter of appropriations for this object with the European countries are highly interesting and illuminating to the average Congressman, yet as long as the iminency of this actual need appears to be so remote, the tendency is for him to act slowly. Living in a country which fortunately is at peace with the world, having been involved in but two foreign wars during a century, with broad oceans on either side of its domain, without the embarrassment of entangling alliances with other Powers and no immediate prospect thereof, it is not strange that the American people are less moved by the fear of war and an appeal to the need of National defence than their less fortunate brothers in other lands. This sentiment is reflected in no small degree by the attitude of Congress not alone in the development of the narrower field of aviation but in the appropriations for both the army and navy. Without denying the fact that there is a very strong sentiment in Congress in favor of providing a greater national defense, particularly as it applies to the Navy, yet it is nevertheless true that there is no "war talk" heard within its halls. Even during the most critical conditions growing out of the recent revolution in Mexico, with daily stories of depredations being committed on our borders involving the rights of protection to American citizens, those in favor of "crossing the line" were very few. The sentiment in and out of Congress is in favor of maintaining peaceful relations with all the other peoples of the world. This feeling is epitomized in the remarks of Secretary of State Wm. J. Bryan in an address at the recent banquet of the Navy League of the United States in the city of Washington, when he said in reply to the call for more battleships: "While you work hard for more battleships, I shall work hard for the next four years to keep you from needing more battleships."

These observations have been made by way of preface to account in part for the reason why Congress has not been more responsive to the calls to meet an exigency which the Governments of all Europe have so signally recognized.

Early in March of last year, with the view of getting before Congress in a concrete form not only what our own and other Governments had accomplished in the development of aviation, but quite as much with the desire to ascertain the attitude of the War Department for its encouragement, the writer introduced the following resolution (H. Res. 448), which was promptly reported out and favorably acted upon by the House:

RESOLUTION.

Resolved, That the great importance and necessity of a practical knowledge of aviation as it relates to warfare being now generally admitted by all civilized nations, some of which are spending large sums of money in equipping their armies with various kinds of air craft as a means both of attack and of transport, the Secretary of War be, and he is hereby, respectfully requested, if not incompatible with the public interests, to send to the House of Representatives full information upon the following points:

First. The results of his investigations and the transmission of any reports made by our official agents in foreign countries as to the development and value of aerial navigation, either for the purpose of warfare or to encourage scientific research.

Second. The extent and cost of our Government's equipment in aeroplanes or other air craft now being used in any capacity by the War Department, and the nature of the instruction in aeronautics which is being given to its Army officers and enlisted men.

Third. The plans now contemplated by the War Department for increasing the present equipment of aeroplanes, hydroaeroplanes, and other air craft for the purposes of warfare and national defense, together with recommendations for such legislation as will adequately provide for such service with reference both to increasing the number of Army officers of the Signal Corps who may be detailed for aviation service as well as the establishment of additional schools of instruction and the building up of our air fleet commensurate with the necessity of properly maintaining our military status among the nations of the world.

The report of the Secretary of War in transmitting such information (contained in House Document No. 718, Sixty-second Congress, Second Session) was not only fully responsive, covering all the points involved in the resolution, but furnished in a most logical and attractive manner many facts of much interest. That part of the report which briefly outlines the plans contemplated by the War Department for increasing the efficiency of this particular branch of the service is especially interesting. For the excellent manner in which the report was compiled much credit is due to General James Allen, former Chief Signal Officer of the Army, whose work in the field of aviation has been notable. It goes without saying that of the eighty pages of that report but seven or eight were devoted exclusively to the development of aviation in the United States, yet our rank in this field compared to other nations is still relatively much less. Indeed, so much has been said and written about this disparity that space

will not be taken here for statistics, comparative tables, etc. We are more concerned in what is to be done in the future than what has not been done in the past.

As an appeal to one's patriotism in defense of his country has always met with the more enthusiastic response, whether it be for the sacrifice of life or in the payment of large contributions for war, so naturally the fostering and encouraging of this new field of enterprise by which man has come to navigate the air has met with its greatest encouragement abroad, as it is considered a means of warfare. It is equally true, but unfortunate, that almost the entire consideration of this subject in America has been given as it has to do with its military aspect. And this, in the face of the protest of an International Peace Congress putting a ban upon the use of aircraft in warfare even before its very destructive powers could have been more than guessed at! However, the movement which has gone forward so rapidly in Europe, by which vast sums of money have been appropriated for increasing the strength of this new arm for military operations both for attack and defense, is being reflected, though with much less ambition, in the United States. Nearly all of the measures which have been introduced in Congress having to do with this subject—and they are not many at the most—involve the betterment of our aviation service either as it may apply to the Army or the Navy. Few if any appropriations have been asked for in these various bills except as they concern their application to some military service. They have mainly concerned increasing the size of the Signal Corps, to which aviation duty in the Army has thus far been confined; better recognition of those who engage in this service, either by increase in pay or rank; for the establishment of aviation schools in which the art of navigating the air may be taught, etc. It is undeniably true that the importance of the whole subject has seemingly been slow to dawn upon Congress. Even the practical use of aircraft, whether of the aeroplane type or the lighter-than-air ship in the recent European wars, has not measurably stirred its enthusiasm for a more liberal policy in making appropriations for its development. And yet, there is no one who has kept pace with the rapid development of these machines which navigate the air—especially of the larger Zeppelin type which are capable of carrying through space at fifty miles an hour a load equal to that of our average freight car, which load may consist equally as well of bombs containing high explosives and rapid-firing guns as innocent merchandise or passengers—but who has come to firmly believe that future wars are to be decided by battles in the air. While this belief is not by any means inconsistent with the need of strong navies, yet it does contain much of portent to their limitation of usefulness and efficiency, judged by the past methods of naval warfare. While time alone will demonstrate the relative merits of the aeroplane or the more bulky type of the huge lighter-than-air ship—though it would seem that both are to have advantages in special fields of military operations—yet from the very nature of the case no Nation will henceforth be prepared to go to war, no matter how great its navy, without its complement of aerial craft. The possibilities of their usefulness in ways rendered impossible by any heretofore known method of attack or defense are so patent as to need no enumeration. Should any one of the great European Powers which have made such rapid progress in the development of aviation engage in warfare, the world would be startled with the terrible destructive execution of this modern means of attack. Literally, nothing would be immune from the visitation of their effective work, whether it be in photographing to the minutest detail every feature of the enemy's defenses, or of hurling deadly projectiles for their destruction. Whether it be a stiongly-garrisoned fort on land or a mighty battleship at sea, neither could escape their attack. Indeed, heroic as the remedy may be, it is doubtful whether any other agency would be so effective in bringing about a century's disarmament of the Powers and its accompanying universal peace as the awful destruction of such a war so conducted.

But happily there is a far nobler field for exploiting this wonderful science of navigating the air. It may serve alike the most utilitarian purpose as well as furnish the means for advancing scientific research. In the former use, a hundred limitations, which have hampered man in the problems of transportation, may be avoided; while in the latter field it would be unwise to fix a limit to the undiscovered truths which the scientist may learn. It is indeed along the lines of furnishing transportation—and that whether for passengers, merchandise or the mail—that Congress may be of great aid in advancing the development of aviation. At a time in our economic development when not only expeditious delivery is a factor but more especially a cheapened cost of distribution between producer and consumer is greatly sought after, the potential benefits of such a method of transportation become of prime importance. Almost the sole object of the increased agitation of the good roads movement now so earnestly claiming the attention of both national and State legislators and involving the expenditure of many millions of dollars is to bring about this economy.

Shall not the free air above furnish the commercial highways of the future? Unfortunately, though, to America lies the credit of first actually establishing the possibility of navigating the air, both by aeroplane and the hydro-aeroplane, yet the credit of the extent to which it has been developed has been transferred across the water, and to France and Germany indisputably belong very many of the achievements in this work. To the more mercurial Frenchman, aviation has become almost a fad; and adding to its exhilaration the promise of supremacy in warfare, the whole populace has become enthusiastic on the subject. To the more practical American the aeroplane in particular has been looked upon more as a kite and the paid exhibitions of the aviators have so often been attended with fatal results that no little amount of skepticism prevails as to its practical utility. The report of the distinguished men whom ex-President Taft appointed to consider the establishment of a National Aerodynamical Laboratory should awaken much interest. That their recommendation will have much weight with Congress, there is no doubt. The urgent need of supplying the element of safety to our various types of aerial machines has been recognized from the first; and indeed its lack has done more to retard the development of the science in this country than any other cause. Manifestly, aside from the influence that such lack of perfection may have upon the unwillingness of Congress to encourage the work in a practical way this element of danger constantly stands in the way of its gaining popularity. There is today no greater need in the development of the navigation of the air than the establishment of such an institution as a laboratory in which all the meteorological problems, as well as the more purely dynamical and mechanical, may be worked out. Once a principle is evolved by which more stability can be attained with its consequent lessening in the risk by accident, the development of the various types of aircraft will go forward as rapidly as the improvements in the automobiles. The prestige that comes from "nothing succeeds like success" will impress itself quite as much upon Congress as upon the country at large; and as applied to this whole subject of a better recognition of the work of aviation, such encouragement will take the form of more liberal appropriations for every purpose for which it may be useful to man and with which activity the Government has to do. In that day, legislation affecting its interests will take cognizance of it in the same manner as far as applicable, as it now does of all the existing methods of transportation, convenience of passengers, safety appliances, carrying of mails, regulations as to rights of way, speed limits, license of aviators, competition of rates, use in war, etc. Then, too, will the scientists be enabled to mount the heights heretofore unobtainable, and even without the inconvenience of taking time to alight send by wireless communications their latest reports as to meteorological conditions. They will also be able to announce important discoveries of new properties of solar energy and the medium of that energy, the all-pervading ether.

Burgess Flying Boat Solves Warping Difficulties

By F. H. RUSSELL

F. H. RUSSELL has played a most important part in the development of the areonautical movement in America during the past four years. He is a graduate of Yale University (1900) and for several years was interested in paper manufacturing both in Canada and England and in 1906 he assumed charge of a manufacturing business in New York. He became interested in aviation in the Fall of 1909 when Wilbur Wright made his historic flight up the Hudson. With the organization of the Wright Company in December of the same year, he was made manager of that concern in which capacity he was responsible, to a large extent, for the success of that company until November 1911 when he joined the Burgess Company and Curtis at the time it produced its first hydro-aeroplane. Since that time he has acted in the capacity of manager for the Burgess Company and has been a most important factor in that concern's rapid and substantial growth. Mr. Russell has the most supreme faith in a great future for AIRCRAFT and has entered the movement with the idea of making it his life's work.

THE advantages of the Wright control in aeroplanes of slow speed is pretty well recognized in this country. The use of levers permits of a long range, direct power and quick action. They are used on all warping aeroplanes built by the Wright and Burgess Company in this country and are standard for this type in both the Army and Navy service.

When this type of control, however, is placed on high speed machines, difficulties are at once encountered. This was so marked in the speed monoplane built by the Burgess Company last year that a protest was made by the designer that the controls should be changed before the machine was used.

The fatigue of the warping arm experienced by operators in long distance flights has always been noted and when in high speed machines it reaches almost the danger point to the operator. The pressure caused by warping the wings constantly in gusty weather soon tires out the arm and the wrist motion, with which the lateral steering is accomplished, is at once handicapped by the fatigue caused in constant warping from the wrist.

In the Burgess Flying Boat the lower wings are rigid. The upper wings are mounted on a single steel girder located just forward of the center of pressure. When the warping lever is moved the entire wing warps, the front edge going down as the rear of the wing goes up on one side and vice versa on the other side.

In this way the pressure is equalized throughout the wing and it takes practically no effort whatever to move the lever. Added to the ease of movement is the fact that the wing warped in this way is very much more sensitive than the other type and therefore the movement is less.

The Burgess Flying Boat, with Lieutenant Murray, operated by Mr. Coffyn, on May 6, took quite a flight along the Massachusetts Coast in a ten-mile wind at a mean speed of 66.7 m. p. h. On returning to the factory Mr. Coffyn expressed himself very enthusiastically concerning the ease of control and the lack of fatigue which he felt in operating.

THE BURGESS 1913 NAVAL FLYING BOAT, TYPE K.

The Burgess Naval Flying Boat was designed primarily to meet the requirements of the United States Navy. Its hull, power plant, and main surfaces, each form separate units capable of being assembled and taken down in the least possible time. The principal innovations in the design include:

1. The triangular arrangements of wing struts, allowing the upper plane to be staggered forward of the lower plane in order to increase the carrying efficiency.
2. The upper and lower wing surfaces permanently attached to each other, but capable of folding together.
3. The peculiarly shaped hull.
4. The detachable unit power section.

The aviator and passenger are carried near the bow of the boat, their seats being arranged in tandem. At the canoe-shaped stern are located the elevator and the combination rudder for steering both in the air and on the water. The hull is built up on spruce and oak ribs, double diagonally planked with mahogany, separated by fabric.

The construction of the wings is particularly interesting. While the lower wings include in their frame work both front and rear longitudinal members, the upper surface is constructed with a single heavy steel tube throughout its length, the ribs being so connected to this steel tube as to permit warping the surface without straining the ribs.

The principal dimensions of the Burgess Model K are as follows:

Spread of upper wings	43 feet
Spread of lower wings	36 feet
Depth of wings	5 feet 6 inches
Area of supporting surface	397 square feet
Length over all	31 feet
Length of hull	29 feet 6 inches
Height	8 feet 10 inches

The Burgess Flying Boat is driven by an 8-cylinder 70-horsepower Renault motor. The motor is air-cooled, cooling being effected with the aid of a fan blower driven by the motor. The propeller, 9½ feet in diameter, is mounted directly on an extension of the cam shaft, thereby reducing the 1,800 r. p. m. of the motor to 900 revolutions of the propeller. The cylinders are approximately 3¾ inches in diameter by 4¾ inches stroke. Weight of motor, 400 pounds.

The Flying Boat was taken out for the first time by Mr. Burgess on April 16. After demonstrating its very satisfactory balance in the water and ease of control at high speed (developing about 45 m. p. h. on the water), Mr. Burgess took it up for two short straight flights. Everything ran beautifully and the machine was put up for the day.

A day or two later Mr. Burgess made longer straight flights and part of a curve. This was followed on the third day by a complete turn of fairly small radius. Each time the aeroplane has managed beautifully both in the air and leaving and alighting on the water.

Mr. Coffyn took the controls on April 28 for the first time, despite a 12-mile wind. He operated the machine very easily, and on landing expressed himself as being perfectly satisfied with it.

The motor is started by a large wheel instead of a crank, which is grasped in both hands and which is much safer than a flying crank.

Three views of the new Burgess 1913 naval flying boat. In a series of tests at Marblehead, Mass., on May 13th and 17th, this boat met all of the government requirements, with Frank Coffyn as pilot and Lieut. Murray, U. S. N., as observer. Lieuts. Richardson and Bellinger witnessed the tests and accepted the machine for the Navy Department.

EDITORIAL

WOODROW WILSON, LISTEN!

MR. WOODROW WILSON, President of the United States and Commander in Chief of its Army and Navy, the readers of Aircraft, who form the great progressive class, giving their time, labor and money toward the development of air transportation, are anxious to know what position you are going to take regarding the establishment of a great American air fleet to be utilized for defensive if not offensive purposes.

Some time ago the writer sent you a letter enclosing a copy of his recommendation to Congress in reference to this matter and requested an answer. The only reply so far is a letter from your secretary, Mr. Tumulty, who said that the matter would be brought to your attention.

Now, Mr. President, this is too weighty a subject for you to set aside as unimportant or insignificant. You are the Commander in Chief of the great body of men who defend this country in times of trouble, and it is your business to know that those men are supplied the most up-to-date weapons when they are sent to war to fight for their country. To allow good American citizens to go into battle with arms inferior to their adversaries, is positively criminal, and you as the leader must naturally be held responsible for such conditions in case events should happen in which the American forces were sent to war with antiquated equipment. And that is just what is coming to pass unless our American government equips itself equal to the Germans, French, Italians, English and Japanese, with the latest and greatest of all modern means of warfare—air craft.

To equip and train for war does not mean that our intentions are to begin hostilities with other countries any more than to train an athlete means that he intends to pick quarrels with his neighbors. Because a man is an athlete does not signify that he has to fight, in fact, it is the best reason for him not having to fight. His security against fighting lies in his capability to fight and whip the other fellow if necessary. As you probably know, Mr. President, there has been many an individual trounced and humiliated because he was unable through lack of training to defend himself against some tyranical bully, and as with the individual so with the Nation—its preparedness for war and ability to fight means that it will not have to fight unless it takes the initiative, and no country has the ability to fight in these days, no matter how populous or rich or courageous its people may be, unless carefully trained for it and equipped with the most modern of war devices.

You probably have heard, Mr. President, the story of David and Goliath. As you know Goliath was a great big, well-fed giant, with old-fashioned ideas about fighting. He presumed that because he was big and strong physically and wore a hat and coat and stockings of brass, and carried a big spear, that no other method of fighting was worth considering, and therefore when the boy David went out to give him battle with a new weapon—the sling—Goliath roared with laughter at the sight of him. But we all know what happened: Goliath fell, whipped by a smaller physical force using an entirely new fighting method.

Since that day there has been no letup on the invention of newer and more destructive methods of warfare, and with each innovation there have been old-fashioned Goliaths to laugh and be smitten. In the Philippine war, native soldiers were sent with bows and arrows to fight against American guns. They were brave men, but bravery does not count with old-fashioned weapons against newer inventions, and Aguinaldo's forces were unmercifully slaughtered without a chance to do any damage to their opponents. Just what happened to the Philippinos would happen to the Americans or any other nationality if they were sent to war in these days with land and water forces only in opposition to land, water and air forces combined. The Japanese with a great air fleet working in conjunction with their army and navy could whip America without an air fleet to work in conjunction with its army and navy just as easily as David with a sling whipped Goliath without one.

Japan is pushing forward at a very rapid rate lately toward acquiring an air fleet and a well trained force to handle it. It would be very unfortunate and extremely humiliating for us, to say the least, if, in a few years from now, the boy Japan, owing to having acquired great efficiency in manipulating air fleets, should prove to be a modern David and cause the man America to take the position of Goliath, owing to his infernal egotism, lack of foresight or ignorant prejudice against air fleets.

Woodrow Wilson, we want you as leader of the American forces upon whom the people depend for foresight and sagacity, to consider this matter seriously before this country has to pay in good precious American lives the penalty of unpreparedness for war. And furthermore, we warn you against obtaining information upon this subject from stupid old men whose minds have lost their power of absorbing new propositions. Therefore, we respectfully request that you read pages 3,354 and 3,355 of the Congressional Record under date of February 17th, 1913, or pages 337 to 340 Aircraft, Volume 3, number 12, for a general summing up of the whole matter.

RAPID GROWTH OF THE FLYING BOAT INDUSTRY

THE new Burgess Flying Boat, just completed and recently put through a series of tests, is attracting considerable attention among both the devotees of aviation and motor-boating. This machine represents the latest Burgess ideas in water planes and, like other Burgess machines, it embodies many new ideas in design and construction which are departures from general types.

In designing this new machine Mr. Burgess has made use of his nautical knowledge as well as his flying experience and training, and has endeavored to combine in one machine the most perfect air and water craft. The design of the hull and aeroplane has been so worked out that the machine is exceptionally stable either on the water or in the air, and it is for the reason of making the machine safe in alighting on the water that the hull has been made exceptionally long in front to give considerable buoyancy to the nose of the machine and to prevent any tendency to dive in alighting or ploughing through heavy seas. At the same time the hull has been swept up in the rear so as to eliminate as much as possible the drag of the after part of the hull in getting off the water.

The production of this machine by the Burgess Company and Curtis is but another striking evidence of the fact that American builders and designers are now generally turning their attention to perfecting the Flying Boat to such an extent that it can be taken up by sportsmen with assurance that it is just as safe and efficient as other water craft, and these builders' confidence in the future of the Flying Boat is fully warranted by the fact that large numbers of sportsmen—principally motor boat people—are beginning to take a most active interest in the subject.

All of the manufacturers of this style of air craft report a remarkably good sale of their product lately. Tom Benoist is enthusiastic over the growth of his flying boat business, and Glenn Curtiss gives us a list of names of prominent sportsmen who have recently purchased the Curtiss flying boats. Among them are mentioned such well known sportsmen as Harold F. McCormick, L. A. Vilas and E. R. Hibbard of Chicago, and G. Von Utassy, J. B. R. Verplanck and G. M. Heckscher of New York. These men have heretofore been largely interested in motor boats. Mr. Heckscher who, by reason of his being the principal owner of "Dixie IV" and other speed boats, gives weight to his opinion, states that the flying boat is more comfortable, safer and faster than any of the fast motor boats now in use.

If such is the case, then there is nothing to prevent a speedy growth of the flying boat industry.

There must be thousands of other water sportsmen in the United States who would quickly take up water flying if their interest once became aroused. This can be accomplished in two distinct ways: (1) by the manufacturers entering their boats in competition with one another and also in competition with motor boats in the Motor Boat Meets, and (2) by the manufacturers making their own market as the motor boat and automobile manufacturers had to do in the past by establishing agencies in different sections of the country with expert demonstrators to give free rides and instruction to all prospective purchasers.

BEACHEY'S RETIREMENT.

EVERY few days recently there has been a newspaper account of Lincoln Beachey having retired from the flying game, accompanied by a sensational statement that he felt responsible for the lives of a great many exhibition flyers who had undertaken to emulate his dare devil tactics in the air during the past few years.

These articles, of course, have had a tendency to still further frighten the public against taking up flying and therefore have proved a further detriment to the development of air transportation. In fact, such write-ups tend to create a public prejudice against flying in any shape.

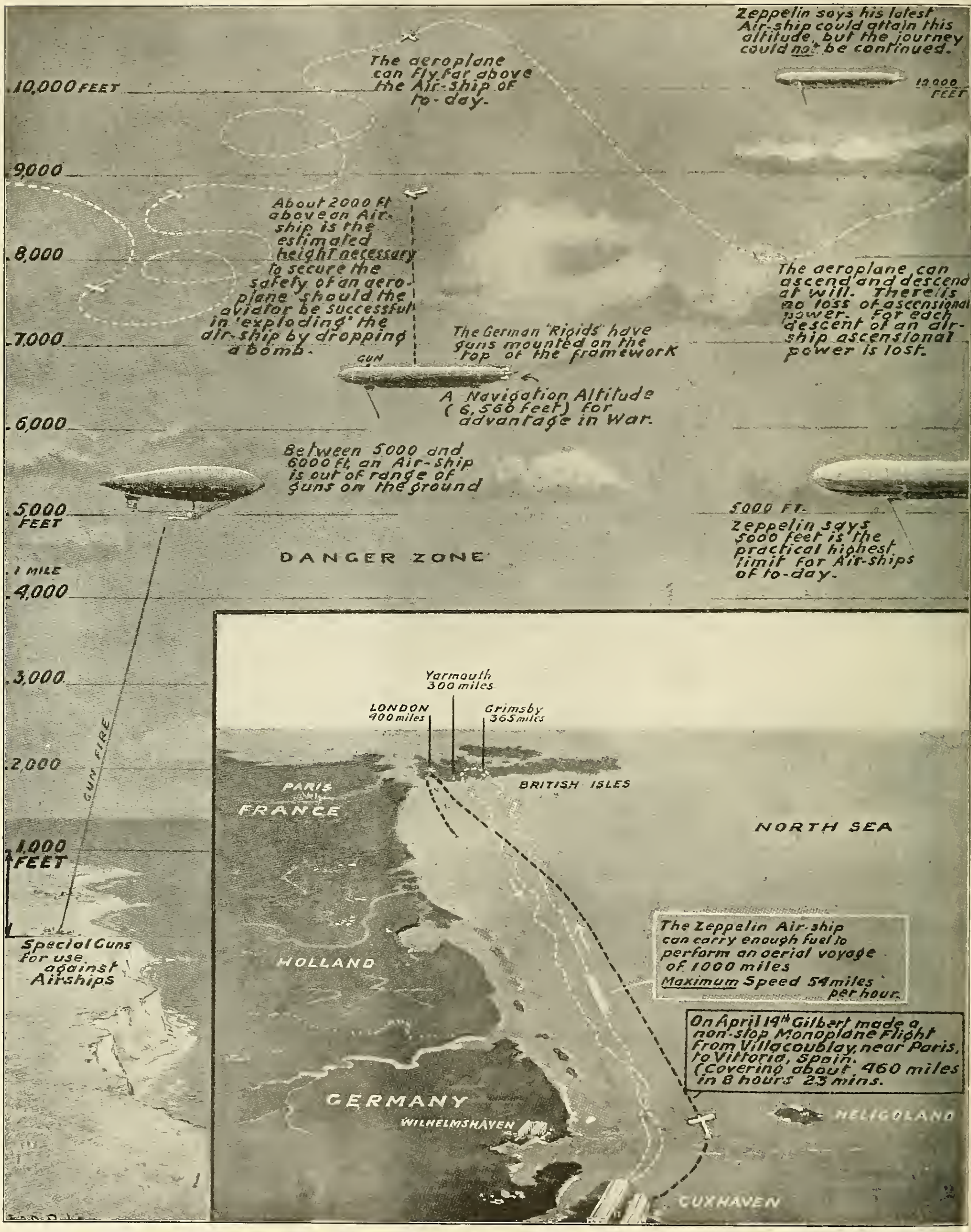
Beachey has made a great many thousands of dollars out of the flying game by doing circus tricks with his machine and while he has been exceptionally clever and miraculously lucky in performing these tricks without serious accident, nevertheless we unreservedly claim that Beachey and other circus performers of the air have been, to a large extent, the actual cause of the slow growth of aeronautical interest in this country.

If the performer in a circus, who does the loop the loop with an automobile should be killed in the performance of that act, that is no reason why the automobile should be blamed, neither should the flying machine be looked upon as extremely hazardous merely because a few exhibition flyers undertake extremely hazardous performances in the air to please a crowd of morbid spectators who pay their money to see such performances.

The aeronautical movement has now got beyond the circus performance stage and with such reckless aviators as Beachey retired, the movement should make more substantial and rapid progress than ever before.

What is needed are sensible demonstrators of safe and sane flying.

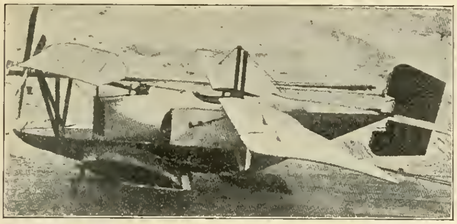
THE DANGER AND SAFETY ZONES OF WAR AIRCRAFT



The above drawing, by W. B. Robinson for the Illustrated London News, shows (1) the ascensional powers of aeroplanes and airships and the values of these powers, and (2) the possibilities of long distance flights by airships and by aeroplanes.

As can plainly be seen, air craft is absolutely safe and out of range of any of the special guns yet constructed for aerial warfare when over 5,000 feet high.

In an article published in the April Review of Reviews (London), Count Zeppelin says: "An airship rises about eighty metres in proportion to each hundredth part of its loss in collective weight (by use of petrol, etc.) . . . My present airship could attain a height of over 3,000 metres, but then there will remain only a little petrol for continuing the journey. She would have consumed the same before, or thrown it as ballast." With regard to gun-fire, Major F. H. Sykes, in a recent lecture, said: "Both with respect to fighting in the air and to firing at them from the ground, the recognizing of air craft is a difficult question. . . . I understand that the Bulgarian fliers think anything under 4,000 feet unsafe from fire. . . . On a clear day observations can be accurately plotted on a map from an altitude of 4,500 feet, at which height the ground seems to be moving very slowly and reconnaissance is relatively easy." The artist is indebted for certain of his points to Count Zeppelin's article in the Review of Reviews (London) and to a very interesting article by Mr. T. F. Farman, in the April Blackwood's (London).



The Breguet experimental tandem hydromonoplane which is being tested at Monaco. It is fitted with a four-bladed tractor propeller and is driven by a 110 H. P. Salmson motor.

Foreign News

BY

Arthur V. Prescott

Austria

A new Lohner-Pfeil biplane for the military flying ground at Nausatz in southern Hungary was delivered in splendid style on April 10th. With Colonel Uzelac as pilot, the machine was flown from Fishamend, near Vienna, to Nausatz, a distance of 400 kilometres, in exactly three hours. The average height attained was 3,500 feet. A telegram sent by the aviator advising his departure from Fishamend was delivered at Nausatz after the biplane had landed there.

Algeria

On April 28 four machines, piloted respectively by Lieuts. Reinbert, Cheutin, Jolain and Hurard, were flown from Biskra to Constantine, a distance of 260 kilometres, in 2 hrs. 30 mins.

England

Two new naval air stations have been established, one at Harwich and the other at Yarmouth, Captain C. E. Riske being in charge of the former and Lieut. R. Gregory of the latter.

Recently successful tests were made at Huntingdon with the Radley-England triple engined hydroaeroplane. Piloted by Mr. England, with two passengers on board, it made a test flight of twenty minutes. This machine has two large boat-like floats anu carries the seats for the passengers—six in all—in these hulls.

Very successful meets continue to be held at the Hendon aerodrome, London, many of the best known English flyers taking part in them each week, while every now and again some of the French pilots come over to deliver and demonstrate new machines and make exhibition flights at Hendon. Chevillard, the crack French pilot of Henry Farman biplanes, recently gave a series of flights at Hendon which opened the eyes of the Englishmen to what the Farman can do in the hands of an expert, for he made banks and glides only to be rivalled by those of Beachey and Brookins in America.

France

FLIES 1 HR. 15 MIN. WITH SIX PASSENGERS.

On May 8 at Chartres the French aviator Frantz, in a Savary biplane, broke the world's record for a flight with six passengers by remaining in the air one hour and fifteen minutes and reaching a height of 2,000 feet with this load.

GUILLAUX FLIES NEARLY ONE THOUSAND MILES IN A DAY.

A distance of nearly one thousand miles in an air line was flown by Guillaux on April 27 in a Clement-Bayard monoplane. He started from Biarritz, in the extreme Southwest of France, and flew through to Kollum, Holland, with only two stops en route. The motor used was a Clerget rotary.

GILBERT MAKES RECORD FLIGHT.

On April 24 Eugene Gilbert beat all records for continuous cross-country flight, flying from Villacoublay, France, to Vittoria, Spain, without a stop. The distance between the two places is about 513 miles, which was covered in eight and a half hours. After a short rest, Gilbert ascended and flew on to Mediana del Campo, where he landed awkwardly and broke a wheel, which prevented him from still further bettering his remarkable record. Gilbert used a Morane Saulnier monoplane, fitted with a 60 H. P. LeRhone motor.

On May 1 Lieut. Broccard, of the Deperdussin center at Rheims, made a new French height record for pilot and two passengers during a flight which lasted 1 hr. 35 min., the height attained being 2,300 metres. The machine used was a Deperdussin monoplane. The world's two-passenger record stands at 3,580 metres, attained by Lieut. Blaschke in a Lohner-Pfeil Austrian-built biplane.

KING ALFONSO AN AERONAUTICAL ENTHUSIAST.

On May 9 King Alfonso of Spain visited the aerodrome at Buc and was a highly interested spectator of aeroplane flights and of the evolutions of dirigibles. Several times the King expressed alarm for the safety of Garros and Chevillard as they executed particularly thrilling feats. In departing he said: "I will advise my country to take example by what I have seen." Altogether 96 aeroplanes and two dirigible balloons participated in the manoeuvres for King Alfonso.

FRENCH LAWS FOR BIRDMEN.

France is preparing legislation for the strict regulation of aerial navigation.

Adrien Thierry, the Minister of Public Works, presented a bill to the Cabinet to-day, providing for the inspection of flying machines, the licensing of airmen and the prohibition of flights over certain districts in the interest of national defence. The Minister said that in France at the present time there are 1,800 aeroplanes.

2,490 LICENSED AVIATORS.

There are 2,490 certificated aviators in the world, according to the annual bulletin of the International Aeronautic Federation. Of these the United States possesses 193, France 968, Great Britain 376, Germany 335 Italy 189, Russia 162, Austria 84, Belgium 68, Switzerland 27, Holland 26, Argentina 15, Spain 16, Sweden 10, Denmark 8, Hungary 7, Norway 5 and Egypt 1.

These figures are but a small proportion of the number of men in the world who are capable of flying, however, which if totaled up would probably approximate 10,000 fliers.

THE AERONAUTICAL INDUSTRY.

Flying machines and accessories for military purposes is now recognized as the one field in which the aeroplane and dirigible balloon are likely to find a permanent and profitable application. The development of the French aeroplane manufacture during the past two years has been phenomenal, and has been almost wholly in the direction of equipment for purposes of war. French manufacturers constructed during the past year 1,425 aeroplanes of various types, with a total motive force of 86,000 horsepower, and their present contracts and prospects indicate an output of not less than 2,000 flying machines, with 125,000 aggregate horsepower, during the present year.

FRENCH MILITARY AVIATION.

An official report has been published, showing details of the work done by the French military pilots during the year 1912:

Number of cross-country flights	2,387
Number of miles flown	313,917
Total duration of flights	5,594 hr.
Number of machines	291
Total H. P.	16,210
Number of holders of superior brevets	203

It should be noted that this refers to military aviation *only*.

Germany

BY STELLA BLOCH.

Of interesting international complications there is apparently no end! Following the involuntary visit of the Zeppelin No. 16 to be listed as Z IV by the War Office, to Luneville, in France, with all its attendant excitement, two officers landed with an aeroplane at Arrancourt, near Luneville, on April 22. They were captain Von Dewall (pilot) and Lieutenant von Mirbach (passenger), on their way from Darmstadt to Metz, who had missed the frontier, and, running short of petrol, and believing themselves to be still in German air, effected a landing about two miles on the wrong side. On enquiring of a girl in the fields where they were and learning that they were in France, they are said to have given vent to understandable, excusable, yet hardly polite exclamations, for to be the heroes of incidents such as were called forth by the Zeppelin, with an endless vista of reports, examinations and all the red-tapeism indulged in by headquarters at such times, is hardly a pleasing prospect. The Sous-Prefect of Luneville and a squad of troops arrived very soon and explanations were offered and received in good fellowship. After an interchange of messages with Paris, the aeroplane was given permission to depart, and at 4 P. M. the two officers set out for Metz, where they arrived soon after 7 o'clock.

According to the new German Army Bill about to be laid before the Diet, the aerial fleet, Bavaria not included, is to be divided into an Inspector-Generalship for both the aviation and airship troops both with headquarters in Berlin. Five airship battalions will be erected. Of the four aviation battalions the staff and one company will he housed at Strassburg, another company joins the troops at Metz, where the second company of the fourth airship battalion will stand likewise. The aerial department of the navy is also to be greatly strengthened.

GERMAN MARINE AERONAUTICAL DIVISIONS.

On May 9 Emperor William issued a decree for the organization by June 1 of a marine airship division with provisional headquarters at Johanisthal, and also a marine aviation division with headquarters at Putzig.

BRINDEJONC DES MOULINAIS FLIES FROM BREMEN TO LONDON.

On May 11 Marcel C. Brindejonc des Moulinais, who has become a regular aerial tourist, having flown during the last three months nearly all over Europe, added another triumph to his already long list by completing a flight of 450 miles from Bremen to London, which was commenced on May 9.

By his flight Mr. Brindejonc des Moulinais has reduced the elaborate regulations formulated by the Home Secretary, Mr. McKenna, to their proper absurdity.

Des Moulinais left Bremen on the morning of May 9 at twenty minutes to 9 in a Morane Saulnier monoplane and was in Hendon at 3 o'clock on the afternoon of May 11.

Interviewed just after his arrival, he simply said he flew from Calais to Dover and from Dover to London at an average height of 3,000 feet. This bears out the contention of Mr. Gustave Hamel that army aviators could fly so high they could laugh at any laws that attempted to control them.

BERLINER WINS TRIAL RACE.

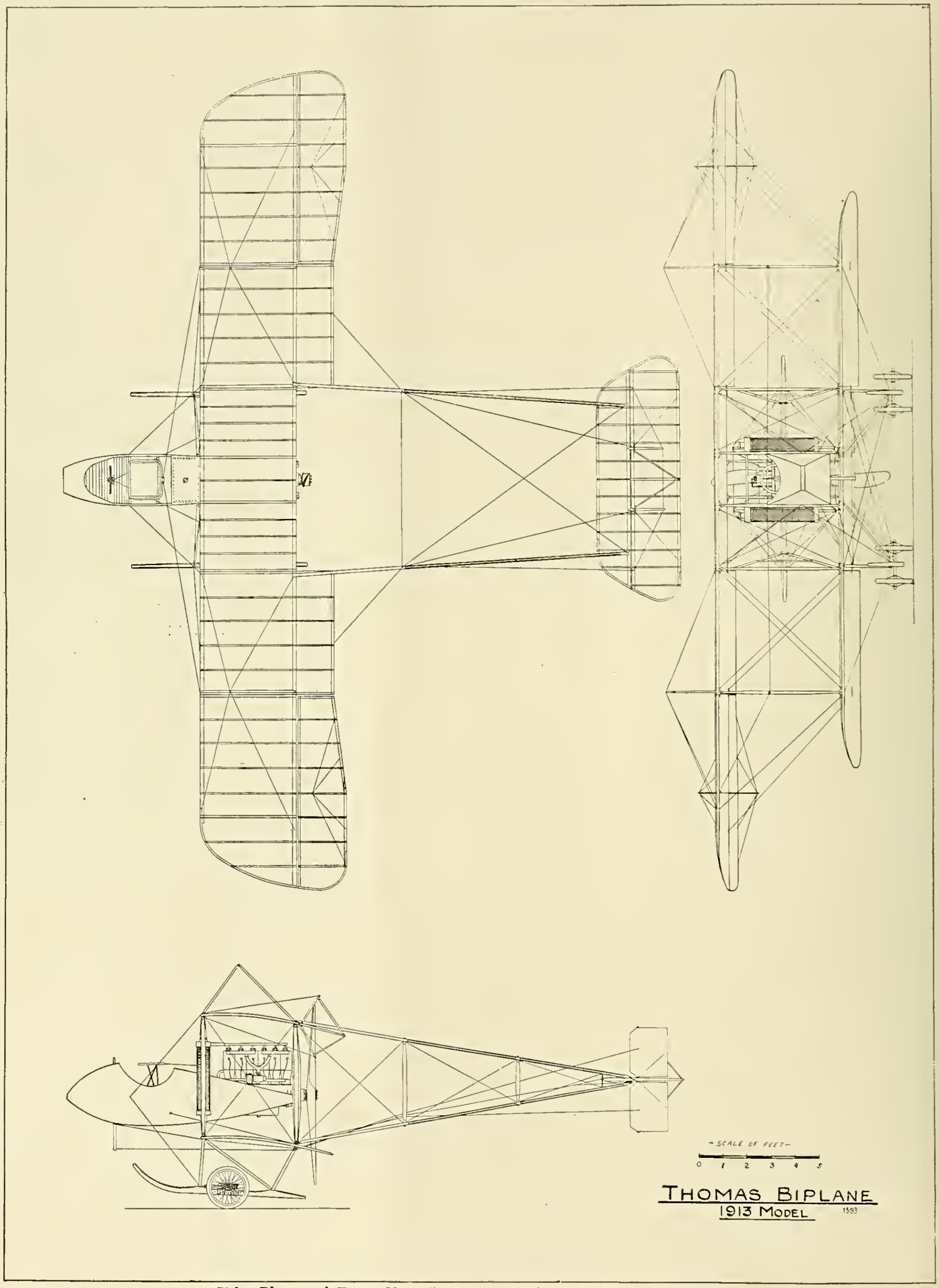
Hans Berliner, pilot of the balloon Nieder-Schlesien, which landed at Arendal, Norway, has been adjudged winner of the eliminatory race started on April 27 for the choice of the representatives of Germany in the contest for the Gordon Bennett international balloon cup, to be held in France in the autumn.

Erich Lemkugel, with the Braunschweig II, and Hugo Kaufen, with the Bladbeck, which landed in Northern Denmark, will probably complete the German team.

GERMAN MILITARY AEROPLANES.

The specification for these is as follows: (1) The machine shall be German built throughout. (2) Comfortable seating, and (3) means for communication between the two occupants must be provided. (4) The occupants must be protected as far as possible from the wind. (5) Provision shall be made in the fuselage for a bomb-dropping apparatus and a camera. The minimum speed is fixed at 56 M. P. H. The span of the machine must not exceed 47½ ft., the length 39 ft., nor the height from the ground 11½ ft. Sufficient tank-capacity must be made for four hours' fuel, and the effective H. P. must not exceed 100.

Scale Drawings of the 1913 Model Thomas Biplane



Side, Plan and Front View Drawings of the New Thomas Biplane

DESCRIPTION OF THE NEW THOMAS BIPLANE

The new Thomas biplane, illustrated in the accompanying drawings, represents the latest product of the Thomas Brothers Aeroplane factory at Bath, N. Y. This machine embodies the latest American and European practises in headless biplane design and is characterized by its extremely pleasing appearance and the neat and comfortable cabin for the pilot and passenger. Its general dimensions are as follows: Spread of upper plane, 33 ft.; spread of lower plane, 23 ft.; chord, 5½ ft.; gap, 5 ft.; length, 23 ft.; power plant, 6 cylinder 70 H. P. Maximotor. Total weight of aeroplane empty, 850 lbs.

Following is a detailed description:

Main Planes—The top main plane has a spread of 35 ft., while the lower plane has a spread of 23 ft.; the chord of both is 5 ft. 6 in. and the gap between the two 5 ft. The greatest depth of the curve is 3¾ ins., which is found approximately one-third distance back of the front edge. The ribs are laminated spruce spaced 11½ ins. apart and measuring ¾ in. wide by 1⅛ ins. deep. They are fastened front and back to the main spars by metal strips. The front spar, which is laminated, is D shaped, and measures 1⅞x1¾ins. The rear spar is also laminated and is approximately of the same dimensions and is rectangular in shape. These spars are placed 44½ ins. apart. The planes themselves are built up in 8 sections each measuring 5x5½ ft. and are joined together with Thomas sockets. The covering, which is applied top and bottom, consists of Goodyear rubberized cloth. The upright struts, which are streamlined off, are attached to the lateral spars with Thomas sockets. For the bracing 3-32 in. aviator cables and special turnbuckles are used.

Elevator—One elevator situated in the rear is used. It is flat and measures 10 ft. long by 2 ft. deep and is braced with ten ribs. The single fixed tail plane is placed in front of the elevator and this measures 10 ft. x 1 ft. deep.

Rudders—Four rudders are located in the rear and these are operated from the wheel by 1-16 cable. They are attached directly to the elevator and perform the double function of control levers for the elevator and braces as well.

Stability—Lateral stability is attained by two ailerons each measuring 8x2 ft. They are attached to the outer extremities of the upper main plane and are operated by 1-16 in. cable passing through special safety leaders.

Running Gear—The running gear is of the Thomas type which is a modified Farman Wright system. Four Goodyear tired wheels each measuring 21x2½ ins. are used and these are placed 30% back from the front of the plane. The two skids, which measure 5 ft. x 2⅜ ins., are attached to the main planes by steel tubing and their track is 7½ ft.

Power Plant—The power plant consists of a 6-cylinder 70 H. P. Maximotor weighing 380 lbs., which drives a 7½ ft. propeller with a pitch of 5 ft., giving a thrust of 485 lbs. The gas tank has a capacity of 18 gallons and the oil reservoir of two gallons. Gasoline consumption is at the rate of 8 gallons per hour.

Miscellaneous—Total weight of aeroplane empty, 850 lbs.; capable of carrying a load of 400 lbs. additional to usual load of gasoline and oil. Speed of aeroplane in calm air 60 miles per hour. Position of centre of pressure 30%.

LEADING AERONAUTICAL MOTORS OF THE WORLD

By WALTER H. PHIPPS

The rapid strides made in aviation and aerostation progress during the last two years, and the present year in particular, can chiefly be attributed to improvement in motor construction and design, for we notice aeroplanes and dirigibles of unchanged design and construction now accomplishing as almost everyday performances flights that were hardly dreamed of three years ago. It was only a few years ago when we used to read in the daily press of Zeppelin airships starting on intended voyages which were continually being halted on account of motor breakdowns, which in many cases resulted in mishaps and wrecks. Now, however, although the general design of the Zeppelin airships has been little altered, the vessels are able to accomplish regularly voyages of several hundred miles, and even trips of a thousand miles or more, without the slightest difficulty, owing to the perfection which has been obtained in their motors.

The same is true of the progress of aeroplane flight, for we find machines of similar design and construction which two or three years ago were seldom able to finish a long flight, now accomplishing them frequently.

This brings us to a consideration of the motors themselves, and it will be understood that the chief requirements of an aeronautical motor are (1) reliability, (2) light weight, (3) efficiency and (4) economy of gasoline and oil consumption. Of course, the chief requirement of an aeronautical motor, or any other motor for that matter, is reliability, but whereas this is usually obtained in automobile, marine and stationary engines through the strength of large and heavy parts, this practise of obtaining strength by employing heavy materials cannot be used in aeronautical motors, for it is very necessary to keep down weight as much as possible. It is therefore necessary in building aero engines to obtain reliability in other ways, and this can only be done through perfect design, perfect choice of materials and perfect workmanship and a careful testing and studying of every piece of material entering into the construction. It is because of these facts, and many others too numerous to mention, that it usually takes considerable time to perfect any gasoline motor and it is for these reasons that the perfection of a motor is seldom reached during the first few years of its existence. It often happens that parts which have proved satisfactory during tests and given good service for a time will suddenly break in service, and it is only after motors have been in actual use for a considerable time that all their weaknesses can be determined and remedied. It is for this reason that we find the great majority of aeronautical motors just reaching a stage of reliability and it is safe to say the progress in aeronautical development, as indicated by the splendid recent performances of motors, will advance in a rapidly increasing rate and that aeroplanes and dirigibles in consequence will be developed to a tremendous extent.

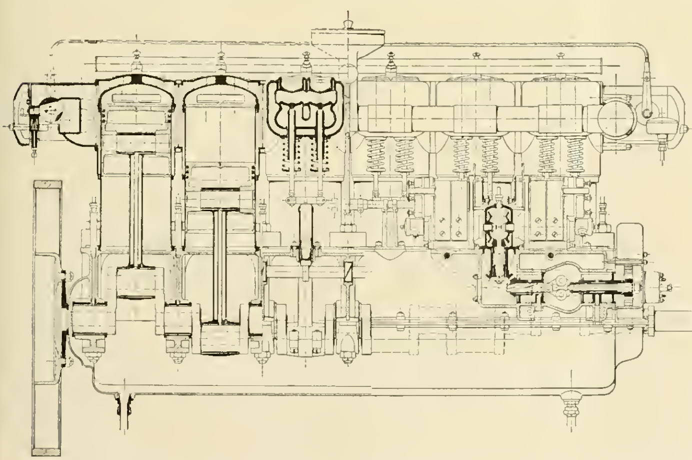
It may be said that there are two distinct classes of aeronautical motors, viz., those intended for aeroplane work and those intended for dirigibles. With the former class reliability has not been obtained to the extent found in the latter, which in the cases of those fitted to large dirigibles like the Zeppelins it has been found feasible to obtain reliability through an increase in weight which would be impossible with aeroplane motors, and thus we find the Maybach engines used in the Zeppelins already reaching a state of reliability only to be approached by automobile motors.

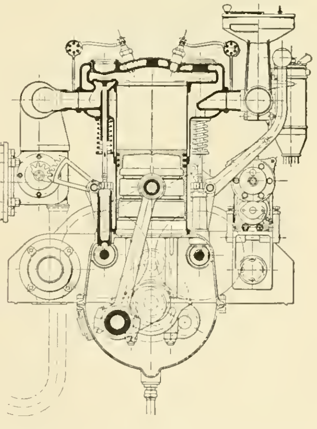
In the case of the aeroplane motors, it is an infinitely more difficult task to obtain reliability and efficiency because the weight must be so small that it is hard to build a motor strong enough to stand the strain for prolonged periods. It is only after carefully studying the performances of their motors in flight that the motor makers have been able to determine their weaknesses and by continuously changing, strengthening, redesigning and substituting various kinds and grades of materials they have been enabled by the slow process of development to gradually bring their motors up to a state of reliability where it is now possible to make flights of prolonged duration.

In striving to obtain this light weight in aeronautical motors, we find designers have resorted to every conceivable means to obtain their end, and thus we find a great number of different types of aeroplane motors each having their own particular advantages and disadvantages. Perhaps the most common design of aeronautical motor, and that which is favored most in this country and in Germany, is the vertical automobile type of motor, redesigned, lightened and strengthened for aeronautical purposes, examples of which type are the Curtiss, Wright, Kirkham, Hall-Scott, Sturtevant, Maximotor, Green, A.B.C., Austro-Daimler, Viatik, Clerget, Chenu, Clement-Bayard, Laviator, Panhard, Argus, Benz, Maybach, Mercedes, Daimler, N. A. G. etc.

Water-cooling is also used in the majority of the eight-cylinder V-type engines (although the Renault and DeDion are air-cooled,) and some of the radial engines.

Air cooling is used successfully in a great many different types of motors, and we even find some vertical types of motors using this system, although in the majority of cases where air cooling is used the cylinders have been disposed either V shape, fan shape or radially, so that one cylinder does not shroud another and there is a better chance of air circulation. In addition, most of these engines are intended to be placed in the draught of the





Diagramatic drawings of the Maybach motors used in the Zeppelin airships. Reliability in these motors has been obtained by making all parts exceptionally strong and by having many parts in double, thus there are double inlet and exhaust valves, double carburetors, double magnetos, double oiling systems, etc.

propeller or else, as in the case of the Renault, to be fitted with a system of forced draught cooling, using a casing surrounding the motor which has air drawn into it by a fan.

Realizing that a jerky motor uses up power through vibration and propeller flutter, it was only natural that designers turned toward the rotary type of engines as a solution for obtaining a smooth running motor combining the advantages of perfect cooling due to speed of rotation and light weight due to the absence of a long shaft and crank case. The chief disadvantages, however, of the rotary type are its enormous head resistance and large gasoline and oil consumption. These disadvantages, however, were offset by the extremely light weight and excellent running qualities of the rotary type, which gave this style of engine such an advantage at the beginning of aviation, when light weight coupled with considerable power meant everything. Now, however, aeroplanes have been more perfected and the various other types of motors improved and lightened so much that the rotary is no longer in such evidence.

In this country the standard water-cooled design of vertical and V-type motors have been the most popular, and these have been developed to such an extent that they are now fast approaching a high state of efficiency and reliability, as shown by the performances of some of the leading makes of American motors during the last year or so. The Curtiss, Kirkham, Boland, Wright, Maximotor, Sturtevant and other motors all having performed well in actual flight. With regard to the American air-cooled motors, the Kemp motor is a moderately priced engine of a standard vertical type, but employing air-cooled cylinders. It has been used in a number of machines and has given a good account of itself.

Of the radial type of air-cooled motor there are now several different makes on the market in this country, these being the Herbert-Evans engines, which are similar to the Anzani, and are made up in three styles, viz., a small three-cylinder Y-type and two sizes of six-cylinder motors and the Twombly radial motors of 50 and 100 H. P., having seven and fourteen cylinders, respectively.

Of the rotary motors there are the Gyro, the McDowell, the Macomber and Trebert engines, the latter two of which have the cylinders set parallel to the crank shaft, thereby making a very compact motor and greatly cutting down head resistance.

The two-cycle type of motor is represented in this country by the Roberts and the Fox, both of which use rotary distributor valves and are water cooled.

In regard to the French motors, the rotary engines still seem to have the precedence, the well-known Gnome engine still finding considerable favor, although it is being pushed hard by its two newest rivals, the rotary Le Rhone and Clerget motors, which in recent performances for the Pommery Cup and other events have outshone the Gnome. These two new motors, like the American Gyro, use mechanically operated inlet valves, whereas the Gnome uses automatic, and they are very much more economical in gasoline and oil consumption, so much so that Gilbert, in his recent attempt on the Pommery Cup on a Morane-Saulnier monoplane, was able to start on his record-breaking non-stop flight of over 500 miles from Paris to Vittoria, Spain, with a load of gasoline and oil sufficient to run his Le Rhone motor for 12 hours' continuous flight. In fact, when he landed, after covering this distance without a stop, he still had sufficient fuel to last for over two hours longer, and had he not broken a wheel in landing further on at Medina del Campo it is probable that he would have added another 130 or more miles to his trip.

For large machines the 8-cylinder forced draught undergeared drive Renault engine still retains its popularity, for it has been proven to be very reliable and has the record of a 13-hour non-stop flight to its credit. Amongst the other air-cooled French motors the stationary radial Anzanis seem to hold their own. The little 2-cylinder opposed Nieuport of 28 H. P. is still used on the small Nieuports and has proved itself amply powerful enough to take the small Nieuport up to considerable heights and keep it there for long periods.

Amongst the French water-cooled motors there are a great number of vertical and V types being made by some of the leading automobile concerns, as well as a great number of others especially designed and built by firms specializing only in aviation motors. The Salmson motors (Canton-Unne system) are interesting types of radial motors, using water-cooled cylinders. These are the motors which performed so splendidly in the Breguet machines at the recent Monaco hydro meet and they are made to attach either vertically in a machine or horizontally, in which case they drive the propeller through bevel gearing. This system of placing a radial engine horizontally in the fuselage of the machine allows of it being streamlined in at the nose, thereby cutting down the enormous head resistance of the usual radial motor, and therefore doing away with its chief disadvantage while at the same time it still retains the short crank case and shaft, thereby permitting the motor to be made considerably stronger than the usual type of six and eight cylinder water-cooled motor, for the weight saved in the crank case and main shaft is used to strengthen the motor as a whole, which accounts for the reliability and efficiency of this type.

Turning to a description of American motors, we will first treat on the air-cooled types and begin by describing the rotaries first. The Adams-Farwell is a 5-cylinder rotary of the 4-cycle type with a bore and stroke of 6 inches. It was one of the first of the rotary engines ever produced and has many novel points, chief amongst which is the use of only one large valve in the head of each cylinder. This valve is open at the end of the power stroke and remains open during exhaust and also during the suction stroke. It thus answers as an exhaust valve and also as an air inlet valve. During the suction stroke a small liquid fuel valve is opened and a small quantity of liquid gasoline is injected directly into the cylinder in the path of the inrushing air. Carburetion is obtained by the mixture of the two. Speed is regulated by the amount of gasoline allowed to rush into the cylinder. This method of carburetion is undoubtedly simple, but it would appear to be somewhat crude, although it is claimed it works very well in practise. The motor is rated at 72 H. P. and weights 285 pounds.

THE GYRO.

The Gyro rotary motor is made up in several sizes, the most popular being the standard 50 H. P. model and the new 80 H. P. model. The 50 and 80 H. P. types each have seven cylinders and use mechanically operated inlet and exhaust valves, while in addition they have an arrangement for varying the compression. The new 50 and 80 H. P. motors are interesting in that they employ a new method of cooling, having long holes bored lengthwise in the cylinders instead of the usual flanges. It is claimed that the centrifugal force causes the air to rush outwards through these holes, thereby affording perfect cooling of the motors.

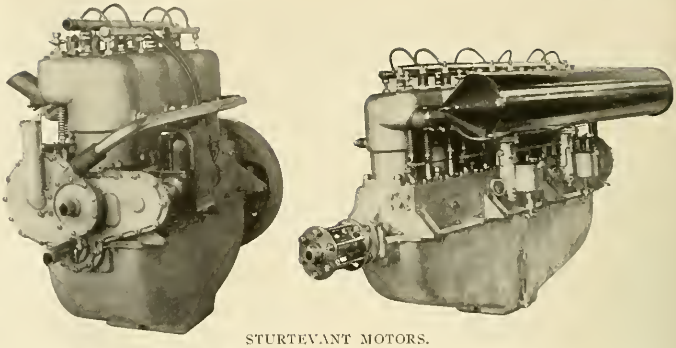
THE MAXIM ROTARY.

The Maxim rotary is a 2-cycle 6-cylinder 60 H. P. rotary with a bore and stroke of 5 inches and a weight of 190 pounds.

The Macomber and the Trebert engines are interesting adaptations of the present gasoline engine principles applied to an entirely new mechanical movement eliminating the revolving crank shaft and producing a very compact rotary motor, having the cylinders running parallel to the propeller shaft. The Macomber engine is rated at 50-60 H. P. with a weight of 190 pounds. The Trebert engine of 60 H. P. has a weight of 220 pounds.

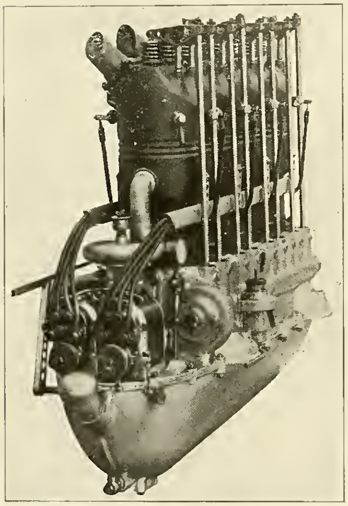
RADIAL MOTORS.

Of the radial air-cooled motors, the Herbert-Evans and Twombly engines are at present the sole exponents of this type in this country, although in the past there have been produced one or two makes of doubtful success. The Herbert-Evans motors, which are similar to the well-known Anzani make, are made in three sizes, viz., a 3-cylinder Y 35 H. P. model, a small 6-cylinder radial of 47-56 H. P. and a large 6-cylinder model of 88 H. P., the weights for these being respectively 156 pounds, 162 pounds and 285 pounds. The Twombly engines are made in two sizes, viz., a 50 and 100 H. P., having 7 and 14 cylinders, respectively.

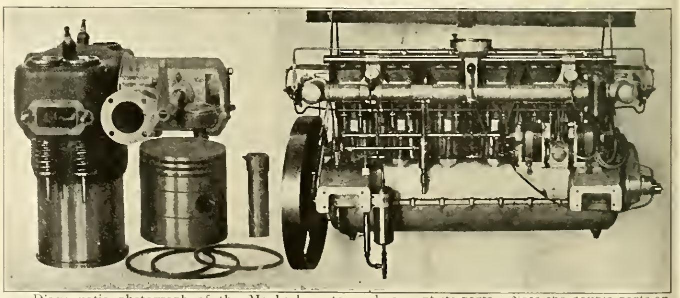


STURTEVANT MOTORS.

On the left is shown the 4 cyclinder 40 H. P. type while on the right is seen the 6 cylinder 60 H. P. type with muffler attached.



The Benz motor which won the Kaiser's motor competition. This motor is fitted with dual ignition and has double springs in the valves so when one breaks the valve continues to work properly. In general design this motor is very similar to the American Maximotor.



Diagramatic photograph of the Maybach motor and some of its parts. Note the double parts on the motor and the double valves in the cyclinder and also the substantial piston and gudgeon pin.

KEMP.

Of the vertical air-cooled type of motors the Kemp is the only American motor of this type. It is made in three sizes, i. e., a 4-cylinder 35 H. P. model, a 6-cylinder 55 H. P. model, and an 8-cylinder 80 H. P. model.

The 1913 models have several improvements on those of last year's type. As regards the improvements, completely new cylinders have been fitted, in which the radiating surface has been increased, the compression raised, both valves placed in the head, and the cooling is accomplished without the use of auxiliary ports. This makes the motor as clean as a car-engine, and as sensitive to throttling, allowing the motor to be throttled to as low as 175 r. p. m. without misfiring, and to run at this speed indefinitely without flooding on either oil or petrol.

It would be well here to run through the main features of this engine. The cylinders are of semi-steel castings. The percentage of steel is small, but greatly adds to the strength and wearing qualities of the soft gray iron. These cylinders are machined all over, except the top part of the cylinder head outside. The radiating fins are machined out, leaving the pores of the iron open to the air, and thus leaving all fins and cylinder walls of a uniform thickness, which means uniform radiation of heat and expansion, one of the most essential parts of all motors. The cooling efficiency has almost been doubled in proportion to radiating surface since this firm's early experiments.

This is accomplished in the depths of the radiating fins, the proper spacing, the proper thickness at the bottom and at the top or outer edge, the fillets at fin base, and the thickness of the cylinder wall. The intake and exhaust valves are extra large and are placed in the head of the cylinder, leaving no pockets or ports for burnt gases to collect in to destroy the new mixture. The exhaust remains open until the piston passes over the center and cleans the cylinders completely, thus insuring the full efficiency from each and every charge. The valves are nickel steel, with extra large stems and fillets at valve head. The intake valve works automatically and the exhaust mechanically, and the valve springs are placed on top of valve housings away from the heat. These are secured with spring-cap and pin, making it impossible for valves to get out of adjustment or work loose, and with the extra long valve guides, valve trouble, including wear, is reduced to the minimum. The spark plug also screws in the head from the top, between and to one side of the valves. The location of the spark at this point insures instantaneous and perfect combustion of the fuel. With the new valve system and the latest type cooling fins, the six-cylinder motors cool to the most efficient working temperature with larger cylinders, higher compression and without the use of auxiliary ports.

The pistons are made from the same material as the cylinders, and are very light and strong. Radiating fins are provided on the head inside and the oil bath inside the motor assists in the cooling of the pistons, to comfortable working temperature. The piston pin is supported in the usual manner and securely locked with the piston, and the bearing is on the connecting rod.

The crank shafts are blocked out of solid bars of vanadium steel 1¾ inches thick and 6 inches wide. This leaves no possible opportunity for flaws or shrink cracks and an absolutely solid and uniform crank is the result. A good, long bearing is provided between each of the cylinders, insuring rigidness, smoothness in operation, minimum of vibration and reliability.

The cam shaft is supported by double bearings at each point where the tappet-rods come in contact with it and at its two extremities. The push-rods can be adjusted from above the cam-housings.

All of the main crank-shaft bearings as well as the connecting rod and cam-shaft bearings are lined with special alloy, high speed nickel motor babbitt, and are all hand scraped to perfect bearing.

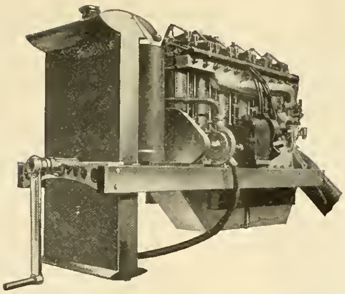
Of the American water-cooled engines these are mostly standard vertical or V types, the leading makes being the Boland, Curtiss, Wright, Maximotor, Kirkham, Sturtevant, Leighton and Welles and Adams.

STURTEVANT AERONAUTICAL MOTORS

By W. M. Rose.

The Sturtevant aeronautical motors are of the vertical, water-cooled, four cycle, automobile type, built in two sizes, four cylinder and six cylinder, rated at 40-50 H. P. and 60-70 H. P. respectively. These motors are substantially the same as they were when they were placed on the market about a year ago at the time of the New York Aero Show.

The bore and stroke of each model is 4½ in. by 4½ in. and the recommended speed is from 1200 to 1500 r. p. m. The cylinders are of the L type with the exhaust and intake valves

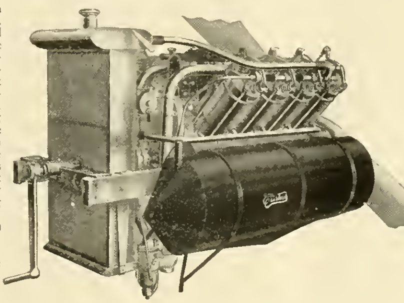


6-Cyl. 60 H. P. Curtiss Power Plant.

on the same side, allowing their operation from a single cam-shaft and without the use of overhead rocker arms. The valves are also very easily removed without disturbing any other part of the motor. The cylinders are cast of a special semi-steel mixture with integral water jackets.

The crank shaft is machined from a solid billet of 3½% high carbon, nickel steel of large diameter and bored hollow throughout. A bearing is provided between each cylinder and a ball thrust bearing is fitted to the driving end.

The connecting rods are of drop-forged nickel steel. The big ends are fitted with interchangeable, die-cast bushings of Parsons' White Brass, and the small ends are bushed with phospher bronze. The pistons are of semi-steel, the same material as used for the



8-Cyl. 80 H. P. Curtiss Power Plant.

cylinders, and are fitted with three rings. Both the pistons and connecting rods are carefully balanced to insure the operation of the motor with the least possible vibration.

The cam-shaft is machined from solid steel, leaving the cams integral, and these are accurately shaped by grinding. The cam-shaft is supported throughout its length by the same number of bearings as the crank-shaft.

The base is an aluminum casting of a special alloy, cast in the Sturtevant Company's own foundry. The timing gears are enclosed in an integral oil-tight casting, which enables the gears to run in an oil bath.

The oil sump, which forms the lower part of the motor is a very light aluminum casting, designed to fulfill its only purpose of forming a reservoir for carrying the lubricating oil. Its capacity in each size of motor is sufficient for five hours' continuous operation without replenishment.

The lubricating system is strictly forced feed by means of a gear pump, and the oil is delivered under pressure to all the bearings through cored oil ducts cast within the base. The oil enters the hollow crank-shaft at the main bearings and is conducted through the arms of the crank-shaft to the connecting rod bearings. No hand oiling is necessary on a single part of the motor, and no grease cups are used. This system of lubrication is the most approved practice in motor car design.

The Zenith Carburetor is now used and it is so well known that no description is necessary. A means is also provided for supplying the carburetor with warm air from the exhaust which insures the motor a uniform mixture under all conditions due to variation of temperature and altitude. Two carburetors are used on the six-cylinder motor which is almost universal practice with six and eight-cylinder Aeronautical motors where it is necessary to obtain the maximum H. P.

The motors are fitted with Waterproof Magnetos. The crank-shaft extends through the rear of the motor to allow for the application of a starting crank. A device is provided for lifting the exhaust valves and relieving the compression in the cylinders when stopping the motor, a necessity when the propeller is driven through a chain drive.

The motors may be fitted with a fly wheel and single or double sprocket for use in connection with a chain drive, or a propeller flange is furnished when it is intended to apply the propeller direct to the crank shaft. A very light and extremely efficient muffler can be supplied, as shown in the accompanying photograph. This is a feature which the Sturtevant Company have given a great deal of attention to during the past season and is, undoubtedly, a very desirable refinement to the Aeroplane Motor. Practically every Sturtevant motor which is now in use is fitted with both a muffler and a starting crank, which shows that the loss in power from the use of the muffler and also, its additional weight, is not of any great amount.

CURTISS MOTORS

By Lyman J. Seely.

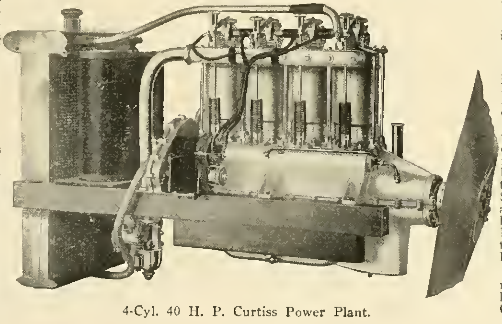
Curtiss motors for 1913 are in four models, covering a range of from 40 to 100 H. P. These motors are too well known to require lengthy description here. Their development represents ten years of constant study and observation, under everyday use in motorcycles, dirigible balloons, aeroplanes and hydroaeroplanes. World's records, American records, many of them that have stood for years, and trophies of international significance, are their milestones of progress. And they furnish indisputable proof of the power, speed, endurance and reliability of the Curtiss product.

For practice work in light machines the Curtiss Motor Company offers the 4-cylinder vertical type 40 H. P. motor. This type of motor, now greatly improved in detail and increased in size, was used in hundreds of exhibition flights by Glenn H. Curtiss and his pupils during 1909 and 1910. The bore and stroke are now 4x5 inches; the motor weighs 175 pounds, and produces a thrust of more than 300 pounds with a 7-ffot propeller.

A new type for the Curtiss Company is the 6-cylinder vertical type, 60-75 h. p., Model S motor put on the market this year. As an early evidence of its abilities Ensign Victor Herbster used one of these motors at Annapolis this month when he established a new altitude record for hydroaeroplanes, even though his propellers were geared so low the engine fairly "ran away" with them, turning up nearly 1,700 r. p. m. The speed was so unusual that the naval officers throttled the engine down to 1,575; even then Ensign Herbster bettered the previous altitude record for hydroaeroplanes by 1,500 feet. This motor also has bore and stroke of 4x5 inches; it weighs 245 lbs.; gives a thrust of more than 400 lbs.; and is but 31½ inches long.

Model O, 8-cylinder, V-type, 80 h. p. Curtiss Motor, has a list of achievements to its credit that would fill a book. With it were made the present American records for altitude, distance, duration, as well as all official biplane speed records. This motor complete weighs 300 lbs., and under French government test developed and maintained for three hours an average of 86 brake horse power. It is used extensively by the armies and navies of the United States, Russia, Austria, Germany, Japan, and others, by each of which it has been subjected to most severe tests. Recently adopted, after much investigation, by Harry Atwood and Marshall E. Reid for use in their flying boats.

Model O-X, an 8-cylinder, V-type motor, developing 90-100 h. p., is the latest product of the Curtiss Motor Company. It weighs but 320 lbs., de-



4-Cyl. 40 H. P. Curtiss Power Plant.

TABLE OF THE LEADING AMERICAN AERONAUTICAL MOTORS

NAME	Horse Power	Type	Cycle	CYLINDERS			Cooling	Weight	Revol'ns	PROPELLER				Price
				Number	Bore	Stroke				Name	Diam.	Pitch	Thrust	
Adams-Farwell	72	Rotary	4	5	6″	6″	Air	285 lbs.	1000	Adams-Farwell	9′ 0″	6′ 0″	440 lbs.	$2,500
Boland	60	V	4	8	4″	4″	Water	240 lbs.	1400	Boland	7′ 0″	5′ 0″		2,500
Boland	100	V	4	8	4½″	5½″	Water	300 lbs.	1100	Boland				
Call	50	Opposed	4	2	6″	5¼″	Water	150 lbs.	1800	Call				1,000
Curtiss (Model T)	40	Vertical	4	4	4″	5″	Water	175 lbs.	1300	Curtiss	7′ 6″	5′ 0″	310 lbs.	1,200
Curtiss (Model S)	60	Vertical	4	6	4″	5″	Water	245 lbs.	1400	Curtiss	8′ 0″	6′ 0″	400 lbs.	1,750
Curtiss (Model O)	80	V	4	8	4″	5″	Water	285 lbs.	1350	Curtiss	8′ 0″	7′ 0″	500 lbs.	2,250
Curtiss (Model O-Y)	100	V	4	8			Water	308 lbs.	1400–1600	Curtiss				3,000
Fox	60	Vertical	2	4	4¾″	4¾″	Water	200 lbs.	1000–1600	Choice				900
Fox	90	Vertical	2	4	4¾″	4¾″	Water	280 lbs.	1000–1600	Choice				1,350
Welles & Adams	50	Vertical	4	4			Water	200 lbs.	1200	Choice				
Gyro	35	Rotary	4	5	4.30″	4.75″	Air	120 lbs.		Simmons				
Gyro	50	Rotary	4	7	4.30″	4.75″	Air	160 lbs.		Simmons				2,000
Gyro	80	Rotary	4	7			Air	230 lbs.		Simmons				
Herbert-Evans	35	Y	4	3	4¾″	5½″	Air	156 lbs.	1200					600
Herbert-Evans	45–55	Radial	4	6	3.75″	5″	Air	162 lbs.	1300	Choice				900
Herbert-Evans	85	Radial	4	6	4¾″	5½″	Air	285 lbs.	1200	Choice				1,600
Hall-Scott	40	Vertical	4	4			Water	160 lbs.	1250	Hall-Scott	7′ 0″	5′ 0″	300 lbs.	1,500
Hall-Scott	60	V	4	8			Water	265 lbs.	1250	Hall-Scott	7′ 6″	5′ 0″	400 lbs.	2,250
Hall-Scott	80	V	4	8			Water	300 lbs.	1200	Hall-Scott	7′ 6″	6′ 0″	480 lbs.	2,750
Hall-Scott	100	V	4	8			Water			Choice				
Harriman	50	Vertical	4	4	4″	4″	Water			Choice				
Kemp	18	Vertical	4	2	4¼″	4½″	Air	55 lbs.	1200	Choice				350
Kemp	35	Vertical	4	4	4¼″	4½″	Air	192 lbs.	1200	Choice				485
Kemp	55	Vertical	4	6	4¼″	4½″	Air	272 lbs.	1200	Choice				750
Kirkham	50	Vertical	4	4	4 5/16″	5⅛″	Water	190 lbs.	1400	Kirkham (direct)	7′ 0″	4′ 9″	350 lbs.	1,100
Kirkham	70	Vertical	4	6	4 5/16″	5⅛″	Water	280 lbs.	1400	Kirkham (direct)	7′ 6″	5′ 0″	480 lbs.	1,650
Kirkham	80	Vertical	4	6	4 5/16″	5⅛″	Water	310 lbs.	1750	Kirkham (geared)	8′ 6″	8′ 0″	550 lbs.	1,800
Leighton	40–50	Vertical	4	4			Water			Choice				
Maxim Rotary	50	Rotary	4	..			Air			Choice				
Maximotor	40–50	Vertical	4	4	4½″	5″	Water	200 lbs.		Choice				750
Maximotor	60–70	Vertical	4	4	5⅛″	5½″	Water	245 lbs.		Choice				950
Maximotor	70–80	Vertical	4	6	4½″	5″	Water	275 lbs.		Choice				1,250
Maximotor	90–100	Vertical	4	6	5⅛″	5½″	Water	350 lbs.		Choice				1,500
Maximotor	150	Vertical	4	6	6″	6″	Water			Choice				
Macomber	50	Rotary	4	7	4¼″	4¼″	Air	190 lbs.		Choice				2,000
McDowell	50–60	Rotary	..	7			Air			Choice				
Mead	50	Vertical with rotary valves	4	4	4¾″	4½″	Water	275 lbs.	1100	Choice				
Roberts	50	Vertical	2	4	4½″	5″	Water	178 lbs.	1200	Choice				1,200
Roberts	75	Vertical	2	6	4½″	5″	Water	252 lbs.	1200	Choice				1,800
Roberts	125	Vertical	2	6	5½″	6″	Water	475 lbs.	1100	Choice				2,880
Sturtevant	40–46	Vertical	4	4	4½″	4½″	Water	200 lbs.	1400	Choice			approx. 375 lbs.	1,500
Sturtevant	60–70	Vertical	4	6	4½″	4½″	Water	285 lbs.	1400	Choice				2,000
Trebert	50	Rotary	4	6			Air			Choice				
Trebert	80	V	4	8			Water			Choice				
Twombly	50	Radial	4	7	3¾″	4″	Air	175 lbs.	1200	Gibson				
Twombly	100	Radial	4	14	3¾″	4″	Air	235 lbs.	1150	Gibson				
Wright	35	Vertical	4	4	4⅜″	4″	Water	185 lbs.	1500	Two Propellers	8′ 6″	22°	280 lbs.	1,250
Wright	60	Vertical	4	6	4⅜″	4½″	Water	265 lbs.	1400	Two Propellers	8′ 6″	22°	390 lbs.	1,875
Wright	90	Vertical	4	6			Water							

Table of Details of the Leading Foreign Aeronautical Motors

NAME	Horse Power	Type	Cycle	CYLINDERS Number	Bore	Stroke	Cooling	Weight	Revolutions
				ENGLAND					
A. B. C.	45	Vertical	4	4	120 mm.	114 mm.	Water	200 lbs.	1450
A. B. C.	85	V	4	6	127 mm.	100 mm.	Water	220 lbs.	1400
A. B. C.	120	V	4	8	127 mm.	100 mm.	Water	345 lbs.	1350
Green	35	Vertical	4	4	140 mm.	152 mm.	Water	503 lbs.	1200
Green	68	Vertical	4	4	140 mm.	146 mm.	Water	340 lbs.	1185
Green	100	Vertical	4	6	105 mm.	120 mm.	Water	191 lbs.	1175
N. E. C.	50	Vertical	2	4	--------	--------	Water	--------	----
N. E. C.	100	V	2	4	--------	--------	Water	--------	----
Wolseley	60	V	4	8	96 mm.	140 mm.	Water	370 lbs.	1150
Wolseley	60-80	V	4	8	96 mm.	140 mm.	Air and Water	300 lbs.	----
Wolseley	120	V	4	8	127 mm.	178 mm.	Water	635 lbs.	1150
Sunbeam	150	V	4	8	80 mm.	150 mm.	Water	475 lbs.	2500
Dorman	60	V	4	8	4 ins.	4¾ ins.	Water	300 lbs.	1200
				AUSTRIA					
Austro-Daimler	60	Vertical	4	4	120 mm.	140 mm.	Water	255 lbs.	1350
Austro-Daimler	90	Vertical	4	6	120 mm.	140 mm.	Water	375 lbs.	1300
Austro-Daimler	120	Vertical	4	6	130 mm.	175 mm.	Water	450 lbs.	1200
				FRANCE					
Anzani	30	Fan	4	3	105 mm.	120 mm.	Air	120 lbs.	1300
Anzani	35	Y	4	3	105 mm.	120 mm.	Air	125 lbs.	1300
Anzani	45	Radial	4	6	90 mm.	120 mm.	Air	154 lbs.	1300
Anzani	60	Radial	4	6	105 mm.	120 mm.	Air	200 lbs.	1300
Anzani	80	Radial	4	10	90 mm.	130 mm.	Air	238 lbs.	1250
Anzani	100	Radial	4	10	105 mm.	140 mm.	Air	308 lbs.	1200
Anzani	200	Radial	4	20	105 mm.	140 mm.	Air	--------	1200
Aviatic	70	Vertical	4	4	124 mm.	130 mm.	Water	253 lbs.	1200
Aviatic	100	Vertical	4	4	140 mm.	140 mm.	Water	330 lbs.	1200
Aviatic	150	Vertical	4	4	155 mm.	165 mm.	Water	360 lbs.	1200
Burlat	40	Rotary	4	8	95 mm.	120 mm.	Air	190 lbs.	1800
Burlat	70	Rotary	4	8	120 mm.	120 mm.	Air	265 lbs.	1800
Burlat	140	Rotary	4	16	120 mm.	120 mm.	Air	500 lbs.	1800
Clerget	60	Rotary	4	7	120 mm.	120 mm.	Air	200 lbs.	1250
Clerget	200	V	4	8	140 mm.	160 mm.	Water	500 lbs.	1200
Chenu	75	Vertical	4	6	110 mm.	190 mm.	Water	370 lbs.	1200
Chenu	120	Vertical	4	4	150 mm.	200 mm.	Water	400 lbs.	1200
Chenu	180	Vertical	4	6	150 mm.	200 mm.	Water	500 lbs.	1200
Clement-Bayard	100	Vertical	4	4	135 mm.	160 mm.	Water	465 lbs.	1150
Dansette-Gillet	50	Vertical	4	4	105 mm.	160 mm.	Water	240 lbs.	1200
Dansette-Gillet	75	Vertical	4	4	130 mm.	160 mm.	Water	330 lbs.	1200
Dansette-Gillet	120	V	4	8	114 mm.	160 mm.	Water	400 lbs.	1150-1250
Favata	45	Double-Acting (Radial)	4	4	110 mm.	120 mm.	Air	110 lbs.	1200
De Dion	100	V	4	8	90 mm.	150 mm.	Air	--------	1600
Gnome	50	Rotary	4	7	110 mm.	120 mm.	Air	167 lbs.	1200
Gnome	70	Rotary	4	7	130 mm.	120 mm.	Air	182 lbs.	1200
Gnome	140	Rotary	4	14	130 mm.	120 mm.	Air	256 lbs.	1150
Gnome	80	Rotary	4	7	124 mm.	140 mm.	Air	206 lbs.	1200
Gnome	160	Rotary	4	14	124 mm.	140 mm.	Air	275 lbs.	1150
Gnome	100	Rotary	4	9	--------	--------	Air	--------	1150
Gnome	100	Rotary	4	14	110 mm.	120 mm.	--------	220 lbs.	1150
Helium	45	Radial	2	3	90 mm.	90 mm.	Air	155 lbs.	----
Laviator	80	V	4	8	100 mm.	130 mm.	Water	275 lbs.	1200
Laviator	120	V	4	8	114 mm.	160 mm.	Water	418 lbs.	1200
Laviator	200	V	4	8	145 mm.	175 mm.	Water	715 lbs.	1150
Laviator	60	Vertical	4	4	130 mm.	160 mm.	Water	265 lbs.	1200
Laviator	50	Rotary	2	6	100 mm.	130 mm.	Air	210 lbs.	1200
Nieuport	28	Opposed	4	2	130 mm.	135 mm.	Air	--------	----
Panhard-Levasseur	55	Vertical	4	6	120 mm.	140 mm.	Water	259 lbs.	1150
Renault	25	V	4	4	90 mm.	120 mm.	Air	140 lbs.	1600-1800
Renault	35	V	4	8	70 mm.	120 mm.	Air	240 lbs.	1600-1800
Renault	50	V	4	8	90 mm.	120 mm.	Air	380 lbs.	1600-1800
Renault	70	V	4	8	96 mm.	120 mm.	Air	400 lbs.	1600-1800
Renault	100	V	4	12	90 mm.	140 mm.	Air	640 lbs.	1600-1800
R. E. P.	45	Fan	4	5	100 mm.	140 mm.	Air	230 lbs.	1200
R. E. P.	90	Radial	4	7	110 mm.	160 mm.	Air	465 lbs.	1150
Rossel-Peugeot	50	Rotary	4	7	110 mm.	110 mm.	Air	175 lbs.	1200
Salmson (Canton-Unne)	80	Radial	4	7	120 mm.	140 mm.	Water	280 lbs.	1200
Salmson (Canton-Unne)	110	Radial	4	9	120 mm.	140 mm.	Water	350 lbs.	1200
Salmson (Canton-Unne)	200	Radial	4	14	--------	--------	Water	--------	----
Salmson	60	Parallel Rotary	4	7	75 mm.	200 mm.	Air	220 lbs.	----
Le Rhone	63	Rotary	4	7	105 mm.	140 mm.	Air	176 lbs.	----
Le Rhone	85	Rotary	4	9	105 mm.	140 mm.	Air	242 lbs.	----
Le Rhone	120	Rotary	4	14	105 mm.	140 mm.	Air	208 lbs.	----
Verdet	75	Rotary	4	7	112 mm.	140 mm.	Air	220 lbs.	1200
Viale	30	Radial	4	3	105 mm.	130 mm.	Air	165 lbs.	1200
Viale	50	Radial	4	5	105 mm.	130 mm.	Air	200 lbs.	1200
Viale	70	Radial	4	7	105 mm.	130 mm.	Air	255 lbs.	1200
Viale	100	Radial	4	10	105 mm.	130 mm.	Air	325 lbs.	1150
				GERMANY					
Argus	70	Vertical	4	4	124 mm.	130 mm.	Water	--------	1200
Argus	100	Vertical	4	4	--------	--------	Water	--------	1200
Benz (Kaiser Prize Model)	100	Vertical	4	4	130 mm.	180 mm.	Water	375 lbs.	1200
Benz	150	Vertical	4	6	--------	--------	Water	450 lbs.	1150
Maybach	150	Vertical	4	6	--------	--------	Water	--------	1200
Mercedes	70	Vertical	4	4	120 mm.	140 mm.	Water	308 lbs.	1200
Mercedes	100	Vertical	4	6	120 mm.	140 mm.	Water	444 lbs.	1150
Rheinischen Aerowerke Motor	40-50	Radial	4	5	105 mm.	130 mm.	Air	200 lbs.	1200
Haacke	20-25	Fan	4	3	120 mm.	130 mm.	Air	--------	1200
Haacke	50-60	Radial	4	6	105 mm.	130 mm.	Air	--------	1200
Daimler	65	Vertical	4	4	120 mm.	140 mm.	Water	265 lbs.	1250
Daimler	100	Vertical	4	6	120 mm.	140 mm.	Water	360 lbs.	1200
N. A. G.	55	Vertical	4	4	118 mm.	100 mm.	Water	220 lbs.	1500
N. A. G.	95	Vertical	4	6	135 mm.	160 mm.	Water	320 lbs.	1200
				SWITZERLAND					
Oerlikon	50-60	Opposed	4	2	110 mm.	200 mm.	Water	176 lbs.	1150

veloping 90-100 h. p., is the latest product of the Curtiss Motor Company. It weighs but 320 lbs., develops a thrust of 600 pounds, and represents every improvement the experience of the Curtiss Company has been able to suggest. On a recent test for a government observer the motor delivered a maximum of 106 b. h. p. at 1,800 r. p. m.

Full information regarding any or all of the Curtiss motors may be had by addressing the Curtiss Motor Company, 25 Lake Street, Hammondsport, N. Y.

BOLAND.

The Boland motors are of the 4-cycle 8-cylinder V type and are made in two sizes, i. e., 60 and 100 H. P.

The 60 H. P. is the standard type, however. The cylinders are 4 inches by 4 inches, brass water jacketed on the sides, the heads not being jacketed. The valves are concentric and are located in the cylinder head, only the exhaust valve being mechanically operated.

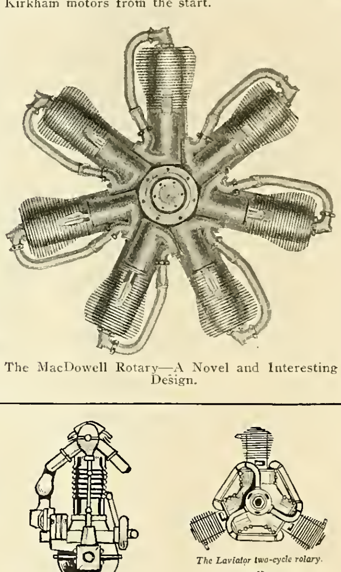
Unique construction is noticed in the nickel steel crank shaft. This is "built up" of five members. One connecting rod is forked at its bearing, the other one working between the forks of the other, and are thus concentric. Oil is forced into the connecting rods and line bearings, then splashing the cylinders. The one-piece connecting rods are hollow chrome nickel steel, cut from solid forging. There are oil pits under each connecting rod so that any change in the level of the machine will not drain oil away from the high end of the engine. The cam shaft is mounted on R. I. V. ball bearings and a big bearing of the same make is used for the center bearing of the crankshaft. The other crankshaft bearings are solid bronze, slipped over the ends. There is no provision for take-up on these, as very little wear has thus far been discovered. They are larger than usual and a better fit is secured by being solid. A ball thrust bearing is used on the propeller shaft. This is tapered and a special hub is keyed to it.

KIRKHAM.

The Kirkham motors are all of the 4-cycle vertical water-cooled type, using separate cylinders. They are built in the following sizes: 4-cylinder 40 H. P. type, with a bore of $4\frac{1}{8}$ inches, stroke of $4\frac{3}{4}$ inches, weighing complete 180 pounds; a new 4-cylinder model of 50 H. P., a special description of which will be found accompanying this article; a 6-cylinder 50 H. P. type, having a bore of $4\frac{1}{8}$ inches, stroke of $4\frac{3}{4}$ inches and weighing 235 pounds, and a 6-cylinder 70 H. P. type, the bore of 4 5/16 inches and a stroke of $5\frac{1}{8}$ inches, weighing complete 340 pounds. This model, which is known as B-G-6, is fitted with a gear drive to the propeller, reducing the propeller speed in a ratio of 4 to 7. This makes it possible to run the engine at its designed speed of 1,680 r. p. m. and use a large diameter and high pitch propeller turning at a most efficient speed, and thus materially increasing the thrust of this motor over another using a direct drive propeller.

All the 1913 models of the Kirkham motor are very similar in design and construction to the very successful 70 H. P. type described above. The 6-cylinder types use two carbureters and two independent single spark magnetos. The 4-cylinder motors are equipped with a single carbureter and a single two-spark magneto. The advantages of the use of two-spark independent magnetos operating independent sets of spark plugs are obvious. Magneto trouble is one of the worst troubles encountered in a motor and few can remedy it. It is eliminated in the Kirkham motors, however, by the above arrangement, as it is rare that both magnetos will give trouble at the same time, and if while in flight one does happen to do so the engine will continue to run well on the remaining magneto. In fact, the machine can be flown with one magneto while the other is being repaired.

All the Kirkham motors are characterized by their simple design and excellent workmanship. The crank case is extra strong and fitted with ample bearing support for the crank shaft. The cylinders are made from a high grade of gray iron cast separate with integral jackets. The pistons likewise are made from special gray iron and each use two special rings. The connecting rods are $3\frac{1}{2}$ per cent nickel steel drop forgings of I section. The crank shafts are made from solid hammer forged billets of Krupp's chrome nickel steel. The inlet and exhaust valves on all motors are of the concentric type, which have been a feature of the Kirkham motors from the start.



The MacDowell Rotary—A Novel and Interesting Design.

WRIGHT.

The Wright motors are made in two standard sizes, a 4-cylinder 35 H. P. model and a 6-cylinder 60 H. P. model, while a new 6-cylinder 90 H. P. type is about to be placed on the market.

The 35 H. P. type uses 4 cylinders with a bore of $4\frac{3}{8}$ inches and a stroke of 4 inches and weighs 180 pounds. No effort has been made to reduce weight at the expense of safety, and a feature is its extreme simplicity. There probably has never been built a practical 4-cylinder motor with fewer parts. The body is cast in aluminum and the cylinders are cast individually of gray iron. The nickel steel crank shaft is cut from the block, as is also the cam shaft, which operates the exhaust valves. The intake valves are automatic. Ample lubrication of bearings and cylinders is obtained by a positively operated pump. The cylinders are water-jacketed with aluminum and a centrifugal pump furnishes effective circulation. As this motor must operate in constantly varying altitudes, the gasoline is supplied directly to a mixing chamber without a carbureter by means of a gear pump and injector which controls the amount of gasoline supplied to each cylinder in direct ratio with the speed of the engine. Ignition is provided by the Mea high tension magneto, offering an exceedingly wide range of control.

MAXIMOTORS.

The Maximotor factory now lists 4 standard models—2 fours of 50 and 60-70 H. P. and 2 sixes of 70-80 and 80-100 H. P.

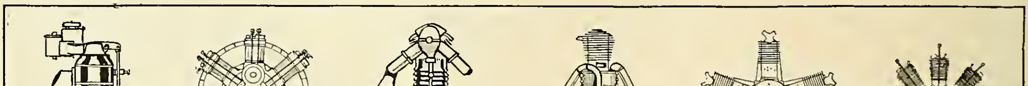
Besides these, the company is prepared to build on special order a 4-cylinder, 100 H. P. of 6-inch bore by 6-inch stroke and a 6-cylinder 150 H. P. of 6-inch bore by 6-inch stroke.

The make-up of the new "military" is of the same high standard. Three ball-bearing crank shaft in the 4-cylinder and 4 in the six.

The oiling system is also unique, consisting in a submerged oil pump, which is placed in the bottom of the oil reservoir, which holds 2 gallons of lubricating oil. The oil pump, pumping the oil through a glass tube, surrounding the intake pipe, serves three purposes: First, as a sight feed; second, the hot oil heats the incoming gas; third, the cool air rushing through carbureter cools the hot oil, making a three-in-one combination.

The ignition is by Bosch or Mea magneto, as may be specified by purchaser. Double sets of spark plugs are provided. Half-way relief valves are arranged so as to facilitate cranking and starting of motor. Maximotors are all arranged in such a way so that the pilot can start his own motor from seat.

The cooling system consists of a centrifugal pump and a specially designed radiator. By an original intake valve arrangement moderate compression and ample water space surrounding the cylinders are valve-pockets, it is almost impossible to overheat the new motors. The makers fully guarantee their new product against overheating, providing proper care is exercised in handling the motor.



DIAGRAMATIC DRAWINGS OF SOME OF THE LEADING EUROPEAN AERONAUTICAL MOTORS.

The New Kirkham Four-Fifty Motor

By Ernest V. Wilken.

The Kirkham Aeroplane & Motor Co., recently tested out one of the new 4 cyl. 50 H. P. motors, which they will place on the market for the coming season. This new motor, which is of the same high-class construction and design as the previous models, greatly resembles the 70 H. P. motor which they manufactured last year. Like in the old "70" the water jackets are extended up over the head of the cylinder and around the valve cages, a method not formerly employed on their smaller motors. The valve unit employed is also similar to that used in the old "70" which is of the concentric type, a type which has given such excellent results in their previous models. The ignition is by a 2-spark magneto.

The new 4 cyl., 50 H. P. motor has a bore of 4 5-16 in. and a stroke of 5 1-16 in. Its recommended speed is 1,400 R. P. M., but it can be run up to 1,700 R. P. M. when chain drive is used or where high speed is desirable. The motor, on test, delivered its rated H. P. at 1,350 R. P. M. and consumed 5 gallons of gasoline and 2-5 of a gallon of oil per hour on a full load run.

A test was also recently made on this motor using the same propeller as was used on last year's model and it was found to deliver the same thrust and turned the propeller the same number of R. P. M. as the 1912, 6 cyl. 50 H. P. motor. This certainly speaks well for the new motor, and, taking into consideration the fact that the price on this new four is only $1,100 complete, and the weight only 190 lbs., it ought to meet with instant approval as it fills a long felt want for a high-class motor at a moderate price.

NEWS IN GENERAL

By D. E. BALL

Hempstead Plains

At the Hempstead Field Spring activity has already set in with great spirit, and in spite of the fire which burnt down four of the hangars there is an increase in the work going on.

The Boland biplane has been doing quite a lot of flying during the month, having been fitted with a dual control system so that Horace Kemmerle, the pilot, could give pupils the benefit of training in the air. A great number of passengers have been carried on it, and during one week-end Kemmerle took up no less than fourteen passengers, one after another. The Boland people expect to have their latest machine (described in the May issue of Aircraft) at the field shortly, and pupils will be afforded every opportunity for learning to fly with as little delay as possible.

Mr. Dyott has brought over a new machine of his own design, especially built for him in England, and has located at the field, where he is putting it through its tests. The machine is very fast and on its first trial was somewhat damaged through Mr. Dyott's inexperiece in handling such a speedy monoplane. It has, however, been repaired and is now making long flights.

In the Beckwith-Crabtree hangar Mr. Crabtree has been busy overhauling the large Beckwith Maximotored tractor biplane, while Mr. Spainour is pushing the work on his monoplane, which is to be fitted with a 60 H. P. Boland motor in place of the small two cycle motor he used heretofore. As this machine flew so well with the little 25 H. P. motor it will be interesting to watch its performance when the new 60 H. P. Boland is installed.

Mr. Frederick Brauninger, formerly of the Gressier Aviators, has taken his Blériot monoplane to the field and is sharing hangar No. 6 with F. C. Hild. Mr. Brauninger intends to open up a school shortly.

Mr. Hild is continuing his demonstration flights and school work and now has two pupils enrolled.

Mr. H. Hamilton has been doing considerable flying during the month on his Blériot type monoplanes, one of which is fitted with a Kemp air-cooled motor.

The Heinrich Brothers expect to locate their school at the field shortly and will use two Heinrich monoplanes.

Chief Pilot S. S. Jerwan of the Moisant School arrived from Augusta, Ga., during the last month, bringing with him a carload of six aeroplanes. Among the corp of Moisant pupils is Lieut. Dante Nanni niof the Guatemalan Army, who has just commenced his instruction and will take delivery of two-passenger carrying monoplanes ordered by the Guatemalan government.

The Moisant Aviation School now occupies the entire block of five concrete bangars, one of which is used by the Moisant Club, and is fitted up in lavish style for the use of the pupils and other members of the club. It is expected that this feature will lend a great attraction to the field and will furnish recreation when the weather does not permit flying. Mr. Charles de Peloggio will continue to represent the Moisant International Aviators as business manager on the field, and Mr. Yves de Villers, the sales manager, will lend his co-operation to make the coming season one of the most successful yet experienced at the field. The company has also built for Harold Kantner a special monoplane of new design and superb workmanship.

Cicero Flying Field

The Lillie School is now running "full blast" and the first spring class is filled. They intend to start a second class about June 7. At present they have three machines on the field and they are building a tractor biplane equipped with a 50 H. P. Gnome motor. One can frequently see six machines in the air at one time on Cicero Field. W. C. Robinson is flying a Nieuport monoplane equipped with a three-cylinder Anzani motor. Taras Weiner has a new tractor biplane driven by a six-cylinder Kirkham motor and the famous Jimmy Ward has several Curtiss types biplanes on the field with which he is entertaining the public every day. The Lillie School machines are flying industriously from 5 A. M. to 7 P. M. daily, when the weather is suitable for training aviation students. Once in awhile you will see Max Lillie taking a spin in the McCormick Umbrella Plane, a freak machine which requires more than ordinary skill in handling. Several machines are expected on the field within a few weeks, machines of all types and sizes having been built in Chicago during the winter months.

The LeGaucier trans-Atlantic flying boat is nearing completion, but the "know-alls" don't think much of it. It is going to be equipped with four 250 H. P. steam turbines, with four propellers. The spread is 100 feet, with a 14-foot cord. The weight, according to its owner, is going to be less than two tons.

Mr. Sidney James, the aeronautical engineer, has just completed a wind tunnel for the testing of models, something we have been in need of for a long time. Now we can build models and determine just what a full-size machine will do. It is to be hoped that this apparatus will be taken advantage of by would-be aeroplane builders.

Oakwood Heights

At the Aeronautical Society's Field at Oakwood Heights, Staten Island, things are picking up in anticipation of the opening meet to be held May 30. Harry Bingham Brown is overhauling the Stevens-Brown-Wright biplane and getting it in shape for the summer season. Miss Law has returned to the field with her Burgess-Wright and has already made a number of flights there, while in the other hangars work is being pushed forward on several new machines.

At Captain Baldwin's private grounds, which are adjacent to the Society's field, the new Baldwin double hangar and factory has been completed and the two Baldwin headless biplanes erected ready for work. These machines, which have been slightly redesigned by their pilot, Cecil Peoli, are now fitted with new tails and double rudders.

Captain Baldwin is always pleased to have interested parties call and see his new place.

San Diego

The most remarkable flight was made on April 13, by Lieut. S. H. McLeary, who has since been relieved from aviation duty and returned for duty with the Coast Artillery.

Lieut. McLeary joined the Aviation Corps at College Park, Md., on July 20, 1912, and learned to fly the Curtiss machine. Since that time he has been doing excellent work at San Diego.

In the above mentioned flight Lieut. McLeary was up for one hour 16 minutes, and attained an altitude of 8,400 feet, making a new altitude record for Army aviators. During the same flight he made a cross-country flight of 65 miles, going from North Island, San Diego, to La Jolla, and return.

Lieut. J. D. Park made a cross-country flight on the same day of about 100 miles, from San Diego to National City, La Masa, around La Jolla and return, making the distance in 2 hours, 5 minutes.

Texas City

The flights at Texas City were nearly all for the instruction of students and carrying passengers.

Lieut. Milling made 57 flights during the week ending April 19, with a total time of 6 hours, 43 minutes. During these flights he gave instruction to Capt. Hennessy, Lieuts. Ellington and Call, and carried a number of Army officers on duty at Texas City, as passengers.

Lieut. Kirtland made 20 flights during the week with a duration of 4 hours and 50 minutes. Lieut. Kirtland instructed Lieuts. Seydel, Kelly and Jones, and also carried quite a few officers as passengers.

There were also 35 flights made by Lieuts. Call, Ellington, Sherman and Graham, at Texas City.

Marblehead

On May 13, at Marblehead, Mass., the new Government flying boat built by the Burgess Company and Curtis for the United States Navy, passed the first series of the government tests. In the matter of rising from the water the new flying boat rose easily within one thousand feet, while the government contract calls for the machine to rise from the water within 1,500 feet. In the endurance test, which required the machine to remain in the air one hour, Coffyn kept it up 1 hr. 8 mins. The riding at anchor test, which called for the machine to remain at anchor in the open sea for half an hour, was accomplished with ease. In these tests Frank Coffyn was accompanied by Lieutenant Murray, U. S. N. Lieutenant Richardson and Lieutenant Bellinger, U. S. N., witnessed the tests.

On May 17th the machine passed the final tests and was accepted by the Navy Department.

Lieut. Murray, who accompanied Coffyn in the government tests of the flying boat, completed his training recently on one of the standard Burgess hydro-aeroplanes.

A new step in the development of the Curtiss Flying Boat is shown in the above photograph of the forward entrance. When the boats are called on for twenty-five to forty trips a day, as each of them is at the Curtiss Camp on Lake Keuka, the time spent in discharging the passengers and taking on new ones counts up very fast. Under the old system the Flying Boats were run high and dry up a runway and onto a turntable, swung half way round, and the door of the cockpit opened on the high side. The new way permits the boat to be run to a dock head on, the windshield is hinged in the middle and the upper half when turned back serves as a gangway. This is cleated to give passengers a good foothold.

A graduating class from the Curtiss Aeroplane School at Hammondsport, New York: Left to right: Back row—J. B. R. Verplanck, F. S. Gostenhofer, Enoch Benner, H. P. Harris, J. Lansing Callan, Van Vleet, Francis Wildman, Beckwith Havens, Mohan Singh. Front row—Charles Niles, Caprain A. Parla, R. V. Morris, G. H. Luther, W. S. Atherton, F. F. Gardner, Gink Doherty, Herbert King.

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Curtiss Affairs

By Lyman J. Seely.

Naval aviators have done themeslves proud since the first of May. During the first week the altitude record for hydroaeroplanes was twice broken. On Monday of the second week three machines, two Curtiss hydroaeroplanes and a Wright machine with Curtiss pontoon, made an over-water flight from Annapolis to Baltimore and return. The distance, estimated at 56 miles, was covered without mishap in one hour twenty-two minutes. In the machines were Ensign Victor Herbster and Ensign W. D. Billingslea in Curtiss No. 1; Lieut. B. L. Smith, of the Marine Corps, with mechanician Pullin in Curtiss No. 2; Lieut. P. N. L. Bellinger with mechanician Boyden in the Wright machine.

Lieut. John H. Towers and Ensign E. C. Chevalier took the Curtiss flying boat to Washington on Tuesday and made a number of fine demonstration flights for those who attended the Langley celebration, where Glenn H. Curtiss received a Langley Medal for his work in developing the hydroaeroplane. Lieut. Towers carried several distinguished passengers, among them Assistant Secretary of War Breckenridge.

To cap the demonstration, on Thursday, Lieut. Towers and Ensign Chevalier drove the Flying Boat from Washington back to Annapolis without a stop. The distance covered was 171 miles, and the time 3 hours 5 minutes. For a hundred miles the officers fought a head wind, but after that were able to fly with reduced power.

One of the recent converts to the flying game is J. B. R. Verplanck, whose home is at Fishkill-on-Hudson. After spending less than two weeks at the Curtiss Training School in Hammondsport, New York, Mr. Verplanck has completed his course and returned to his home, where he expects to have his Curtiss Flying Boat in operation on the Hudson within the next couple of weeks.

Mr. Verplanck will enter his flying boat in the Thousand Mile Reliability Cruise around the Great Lakes in July.

Tokuji Nakmura, D. Macauley and G. R. Strong are graduates of the Curtiss training school at San Diego.

C. A. Vilas, of Chicago, a recent purchaser of a Curtiss Flying Boat, expects shortly to obtain his degree as a hydro-aeroplane pilot.

The latest addition to the list of purchasers of Curtiss Flying Boats is Marshall E. Reid, of Philadelphia.

Harry M. Atwood, who is building flying boats at Sandusky, Ohio, has decided to equip them with the Curtiss Model O, 80 H. P. motor.

At San Diego, Cal., on April 20, two army aviation records were broken at the Army Aviation Camp. Lieut. Samuel McLeary, in a Curtiss Military biplane, climbed 8,300 feet, during a flight of one hour 16 minutes. He flew over Coronado, Tia Juana, National City, La Jolla and Point Loma, and concluded with a volplane of 3,500 feet. Lieut. J. D. Park broke the camp duration record by flying for two hours fifteen minutes, over the city and the harbor at an altitude of 6,000 feet.

Marshall E. Reid, of Philadelphia, has taken delivery of his new Curtiss flying boat and recently tried it out on Lake Keuka, near the Curtiss plant, at Hammondsport, N. Y.

The new boat proved to be the fastest water-flying machine ever built by Glenn H. Curtiss. It rises to planing position on the water within a hundred feet of the starting point. It flies on half throttle, and in the trip of some thirty miles made by Messrs. Curtiss and Reid, while trying it out, the boat was never more than a few feet above the surface of the water. Even when the engine was cut out entirely the boat seemed to float along in the air for hundreds of feet before gently alighting on the water.

Francis Wildman, instructor and demonstrator at the Curtiss Training School in Hammondsport, has completed a record-breaking demonstration trip in Europe.

A new flying boat was to be demonstrated in France for representatives of the Austrian Government. The Curtiss Company was notified by cable on April 26th and Wildman left the next day. He arrived in Paris May 4th, examined and tested machine, made his official demonstrations and was ready to start for home on May 8th. He arrived in New York May 14th.

Two Aviators Fly From Key West to Cuba

On May 17th Domingo Rosillo, the young Cuban aviator, flew from Key West, Florida, to Havana, in 2 hrs. 35 mins., thereby winning the prize of $10,000 offered by the Havana Council.

Another Cuban aviator, named Parla, had hoped to make the flight on the same day, but was prevented from doing so when, in starting, he damaged the float of his Curtiss hydro-aeroplane. He, however, succeeded in flying from Key West to Bay Mariel on May 19th.

Aeronautical Society to Hold Meet on Memorial Day

The Aeronautical Society will hold an opening meet on its field at Oakwood Heights May 30th. The entries include: Cecil Peoli, Horace Kemmerle, Harry Bingham Brown, Miss Law, and others.

First Trials of the New Knabenshue Dirigible

By Roy Knabenshue.

My new airship is 150 ft. long, 30 ft. diam., contains 76,000 cu. ft. capacity and has a gross lift of 4,940 lbs. Balloon with ballonet weighs 1,120 lbs., car complete with water and 25 gal. of gasoline weighs 1,378 lbs., net lift of 2,392 lbs.

The power is derived from a 35 H. P. Hansen engine, 4 cylinders, 4¼ in. bore by 4½ in. stroke, water cooled, develops 39 brake H. P., drives two propellers 425 R. P. M., pitch speed of 90 M. P. H. Approximate speed of ship 30 M. P. H. Car 112 ft. long, suspended by Roebling cable ⅛ in. diam. 7 ft. below balloon, equipped with aeroplanes both front and rear each 120 sq. ft. surface rudders 6 by 10 ft.

First trial May 3, at 6:30 P. M., balanced off and made a good start. Owing to being unfamiliar with controls I made the mistake of elevating the stern which caused a quick descent, and rather than strike the ground, I shut off the engine. Brookins, who was along, thinking to shift the center of weight crawled along the car to the stern. Slight damage to the right forward aeroplane.

Second trial at 10.30 A. M. on the 4th. Balanced off and cleared in fine shape, making good headway, ran into down trend caused ship to pitch, operated aeroplanes which immediately righted ship; every uneven condition was immediately corrected by aeroplanes. Flight lasted 45 min., with perfect control up to within a few minutes of finish, when the tiller rope came off the steering wheel drum. I then shut off the engine and drifted into the top of some trees a few blocks from the aerodrome, breaking up the forward aeroplanes. Being impossible to tow back on account of the size, I deflated. Will inflate again at once, construct larger vertical rudders, and operate entirely with rear aeroplanes.

Mr. Henry C. Cooke, builder of the Cooke biplanes, has just returned from an aeroplane inspection tour of Europe, where he has been studying the latest practices in European design and construction of aeroplanes and states that he has acquired many new ideas which he will incorporate in his new machines. He states that a great many of the German machines have considerable inherent stability and that the general tendency in both biplane and monoplane construction is to slope the wings backwardly.

Fowler Flies Over Panama—Takes Pictures

On April 25th Robert G. Fowler made two flights in the vicinity of Panama. The first flight was around the city of Panama, Ancon and the nearby villages. The second was over the site of the fortifications in the bay and up the canal entrance as far as the Pedro Miguel locks.

On April 27th Fowler flew across the canal from Panama Beach to Colon. He used a Gage tractor biplane and took moving pictures of the scenes below.

Army News

By Henry H. Arnold, 1st Lieut. Infantry.

The entire Second Division of the United States Army, now encamped at Galveston and Texas City, under command of Major General Carter, was scattered over a wide territory, in the vicinity of Texas City on Thursday morning, May 1, solving a maneuver problem in which it was supposed that Texas City was about to be attacked by a large force and the Second Division was sent out to take up a defensive position.

During the extended maneuver all sections of the Signal Corps were brought into play to test means of communication on the battle-field. In fact, this point was an important part of the maneuver and the results were more than satisfactory to the division officers.

All units of the Division began the morning's march at 6:40 o'clock, and reached their respective positions without the least hitch and without the loss of time. Means of communication were quickly established between main headquarters and the brigade commanders by means of wireless, field telephone system—known in army circles as the buzzer—orderlies mounted on motorcycles, and last, but not least, the aeroplane fleet.

The large wireless outfit in use at Texas City was erected at Division Headquarters, and a smaller outfit was stationed at Hitchcock, a distance of about 7 miles. The service was found to be almost perfect and thoroughly proved the efficiency of the wireless system, with which all bodies of the present United States Army are now equipped.

The use of the four motorcycles was a departure from Army custom, especially in Texas. General Carter found that the machine was an important part of the service and that this means of communication, especially in a smooth, level country, where the roads were passable, would soon become popular.

Two aeroplanes played quite an important part in the maneuvers. The Burgess-Wright tractor, with Lieut. Milling as pilot and Lieut. Sherman as observer, left camp at 7 o'clock in the morning and flew to Webster to reconnoiter, back to Algea to locate the position of the enemy, and ended the flight at the field division headquarters, where a report was made to General Carter, accompanied by a map made in the machine during the extended flight. Lieut. Sherman took a number of photographs during the flight, of the towns over which they flew, and upon the return to Texas City several pictures were taken of the encampment.

The Wright biplane was also brought into service, and, with Lieut. Kirtland as pilot and Lieut. Ellington as observer, the flight was made from the camp to Algea and vicinity and later reported to Gen. Carter. Lieut. Ellington also made a map of the country over which they flew, and made it a part of the report of the situation of both the enemy and the different units of the defensive army. A third machine was held at Division Headquarters, and was intended for use should either of the other machines get out of communication, but was not needed. At about 9:30 Gen. Carter ordered Lieut. Milling to make a short flight and locate the Sixth Cavalry. This was done in a very short time and without the least trouble.

At 10:55 the maneuver problem was declared solved by the commanding officers after a conference held at field headquarters, and the commands were ordered to return to camp.

At the end of the maneuver the commanding general sent for the chief signal officer of the division and in the presence of the staff officers stated that he was very highly gratified at the excellent showing made by the Signal Corps, and asked that all officers of that Corps concerned be congratulated upon the success of their work.

Langley Aerodynamic Laboratory

A national aeronautical experiment plant, to be known as the "Langley Aerodynamic Laboratory," is to be established by the Smithsonian Institution. This was decided on at a meeting on May 1st of the regents of the institution. Aerodynamical researches were inaugurated at the Smithsonian by the late Dr. Samuel P. Langley, its secretary, but since his death nothing has been done by the institution along this line.

Aviation School for Manila

Having decided to make the aeroplane a more important adjunct of the army in the Philippines, the War Department has ordered Capt. C. DeForest Chandler, of the Signal Corps, to proceed to Manila and undertake the establishment of an aviation school there. Capt. Chandler, now in the South, formerly was in charge of the army's aviation camp at College Park, Md., and has made many excellent flights.

Hydro-Aeroplane Records for Height Beaten Twice

At Anapolis, Md., on April 24th, the altitude record for hydro-aeroplanes of the rise-from-the-water type was broken by members of the naval aviation staff. In the morning Lieut. P. N. L. Bellenger reached the height of 2,710 feet, beating the former record of Lieut. Towers by 200 feet. In the afternoon Ensign Victor Herbster reached the height of 4,450 feet, believed to be a record in altitude for hydro-aeroplanes.

Lieut. Bellenger used a Curtiss hydro-aeroplane and Ensign Herbster used a Wright hydro-aeroplane with a six-cylinder Curtiss engine. The ascent of the latter was made in forty-five minutes, and the descent in four minutes.

Test Aeroplane Gun

It is announced from Washington that a huge kite to be flown at a height of 700 ft. will be the target of a new army aeroplane gun which is soon to be given its final tests at the Sandy Hook proving grounds. A number of army officials have stated that a gun which will strike a swiftly moving aeroplane at a height of a thousand feet or more is impossible. A year ago a gun was tested at Sandy Hook with little success. The Secretary of War, Mr. Garrison, has given orders that all field guns be remounted on carriages so that they may be used for aeroplane defense.

Notice

The Model Department, edited by Nicholas S. Schloeder, will be run next month.

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PRINCIPLES and Design of Aeroplanes, by Herbert Chatley; second edition, revised; price 50 cents. The Lawson Publishing Company, 37 East 28th St., New York, N. Y.

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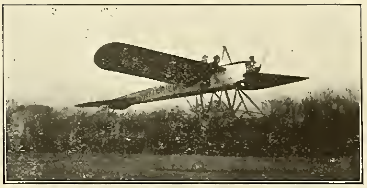

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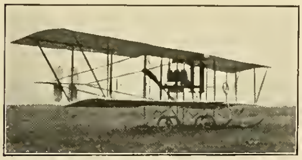

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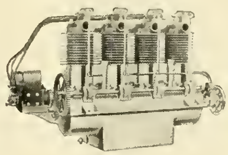

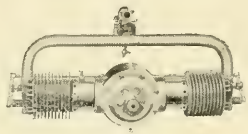

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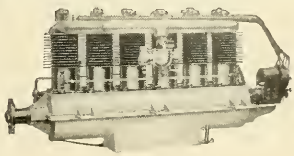

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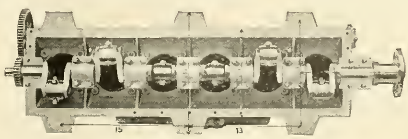

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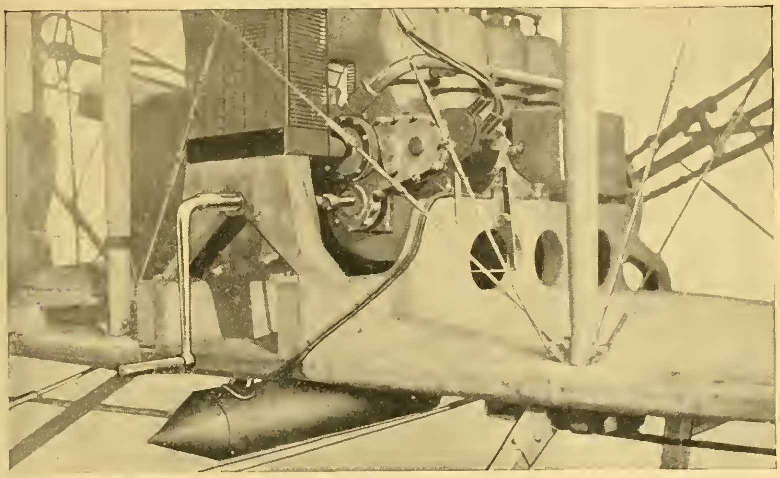

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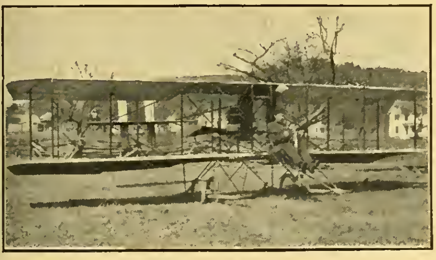

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Bath, N. Y., Feb. 5, 1913

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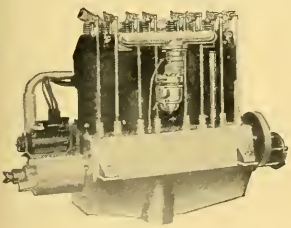

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1906—Two cylinder—World's speed record for 1 mile. Time, 46 1–5 sec.
*1907—Eight cylinder—World's fastest mile to this date. Time, 26 2–5 sec.
1908—Four cylinder—World's first public flight in aeroplane, March 12.
1908—Four cylinder—World's first public flight more than kilometer, winning Scientific American Trophy, July 4.
1909—Eight cylinder—Gordon-Bennett International Speed Trophy, Rheims.
1909—Eight cylinder—American distance and duration records, aeroplanes, winning Scientific American Trophy, Mineola, L. I.
1910—Eight cylinder—American distance and duration records; Albany to New York City, 150 miles in 151 minutes; again winning Scientific American Trophy.
1910—Eight cylinder—First over-ocean flight; 50 miles at Atlantic City.
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1911—Eight cylinder—World's first successful hydro-aeroplane.
1911—Eight cylinder—American biplane speed records, Chicago.
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*1912—American endurance record for aeroplanes, Lieut. J. H. Towers, U. S. N.
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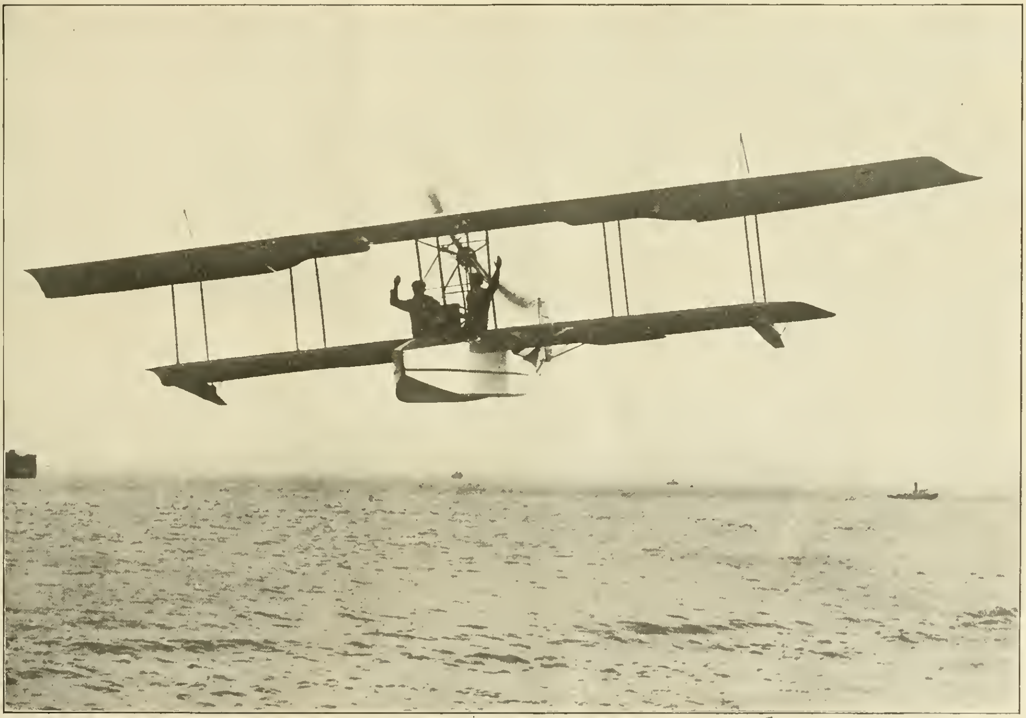

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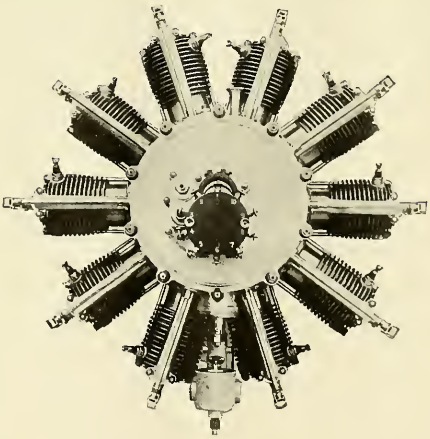

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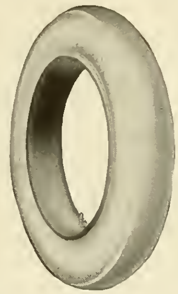

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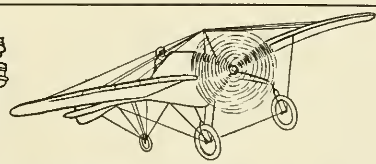

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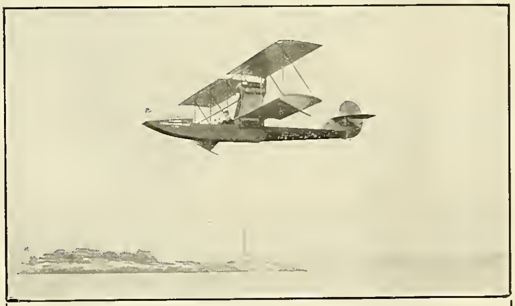

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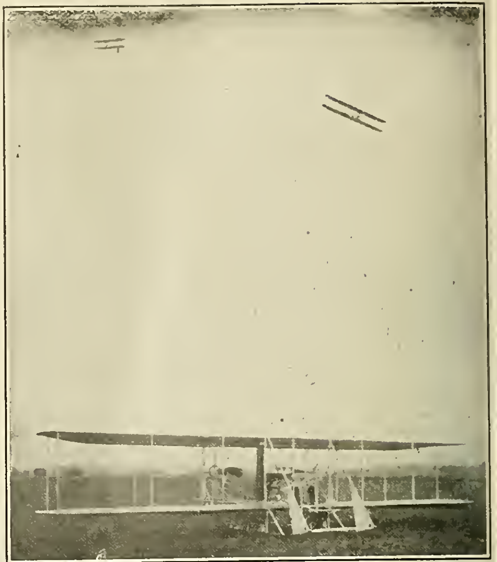

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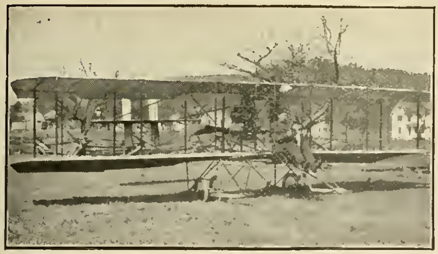

Earl V. Fritts' Thomas Biplane, equipped with 60-70 h. p. MAXIMOTOR

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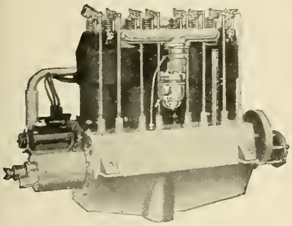

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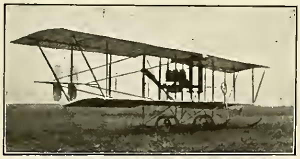

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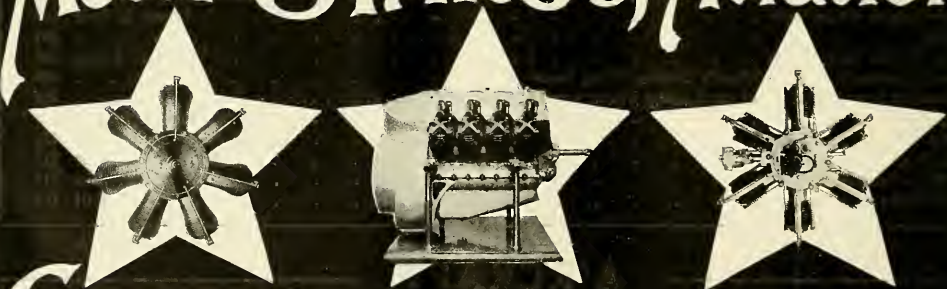

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AIRCRAFT

Vol. 4. No. 5 — New York, July, 1913 — 25 CENTS A COPY $2.00 A YEAR

THE POSSIBILITY OF TRANSATLANTIC FLIGHT

By STANLEY Y. BEACH

STANLEY YALE BEACH was one of the first technically trained men to become interested in dynamic flight in America. In 1902, he, with Gustave Whitehead, commenced that work, and for five years developed a monoplane similar to the Antoinette (which was brought out subsequently in France) and which had great longitudinal stability. United States, Austrian, English and French patents were obtained on this aeroplane, which had foldable wings. A new type of inverted, air-cooled, two-cycle motor was invented, built and tried on this machine. Afterwards, at Morris Park, Mr. Beach and Charles F. Willard built a large monoplane. Later, Mr. Beach organized the Scientific Aeroplane Company and built several monoplanes of the Bleriot type. With these he conducted experiments with a gyroscope for the purpose of maintaining lateral stability. Mr. Beach is a graduate (1898) of Sheffield Scientific School of Yale University. He has been the Automobile Editor of the Scientific American (which paper his grandfather founded) from the beginning of the automobile industry, and is also the Aeronautical Editor of that magazine.

IN a letter to a New York newspaper recently two airship experts decried the possibility of flying across the Atlantic Ocean. Several of the reasons they gave as to why this flight cannot be made have recently been disproved, and in the light of the very latest developments of both the marine and the land aeroplane, the possibility of making the flight during the coming year appears reasonable. Already Capt. Matthew A. Batson, U. S. A., retired, has announced his intention of flying up the coast from Savannah, where he is building a large following-plane machine, and thence across the Atlantic for the "Daily Mail" $50,000 prize, while Anthony Jannus, who last fall made a 1,900-mile flight over water from Omaha to New Orleans, also expects to attempt the transatlantic crossing this summer in a specially built Benoist flying boat equipped with motors aggregating 160 horse power. From his experience in the former trip he believes it practical to make the flight this year. Fog was the only thing that troubled him in his long Mississippi trip while many days he flew in wind and rain.

As regards the latest actual achievement in weight carrying with a land aeroplane, the hour-and-a-quarter flight of the French aviator Frangeois at Chartres recently while carrying six passengers in his biplane is a notable achievement, especially so in view of the fact that he rose to an elevation of 2,300 feet. Heretofore, when carrying any such number of passengers, no machine has risen more than a few hundred feet.

In discussing the transatlantic flight and endeavoring to show the impossibility of making it, the airship experts above mentioned said with regard to large hydro-aeroplanes that "the big load-carrying hydro-aeroplanes of the German Navy demonstrated that in the least seaway they sink deeper and lose the poise to rise again, while ordinary rough waves wrecked them." In controversion of this statement we have it on good authority that there are no really big weight-carrying hydro-aeroplanes in the German Navy. The only marine aeroplanes possessed by Germany are two- and three-man machines. If any of these have been wrecked, it has been because they have been loaded down with more weight than the floats were intended to carry. When this is done, the floats are partially submerged, and it is impossible for any hydro-aeroplane that is overweighted in this manner to get off the surface of the water, even if the sea is not rough. Instead, the floats nose down and draw the machine under water.

The best proof, however, that the modern hydro-aeroplane is able to navigate on a rough sea and in a strong wind is that at the recent meet at Monaco seven of these machines (four of the biplane and three of the monoplane type) ran out of the harbor into the whitecapped Mediterranean on the surface of the water and in a gale of wind, and that all but one monoplane rose successfully from the surface and, with the exception of a second monoplane, flew several miles down the coast to Beaulieu and alighted upon the rough sea. To be sure, one big biplane in alighting was caught by a terrific gust and slammed hard down upon the waves with the result that it was smashed; but Moineau, on the 200 horse power Breguet biplane, was able to alight successfully, rise again from the water, and fly back to San Remo. Here for the second time he alighted on the rough sea. Not only this but he ran about on the surface of the water for a quarter of an hour without accident. It was only when he attempted to rise again at too steep an angle that the wind tipped his machine over backward and the body broke in two. A similar accident happened to Weymann's Nieuport monoplane at Beaulieu. So high were the waves running at the time the machine started from Monaco that an observer standing on the shore was able to see only the extreme top of a biplane when it was in the trough of the waves.

Moineau's Breguet was the highest powered machine in the meet. It was different from the others in that it was provided with a large single float flanked by smaller boat-shaped floats on each side and with still smaller ones at the tips of the lower plane. Besides these five floats, there was the usual small float beneath the tail which is fitted to all machines with a body. In his flight from Beaulieu to San Remo this 200 horse power machine traveled with the wind at a speed of more than 100 miles an hour. It was able to navigate on the rough sea without difficulty and finally came to grief, as above stated, through a false manœuvre.

The lessons drawn from the Monaco meet were: (1) That the higher powered the machine, the better chance it has of navigating on a heavy sea; and (2) that a large single float which is easily lifted out of the water and which is a seaworthy affair resembling somewhat a displacement hull, is better than twin floats of the ordinary notched hydroplane type. The floats, too, must be of ample size to support the weight without sinking more than a normal amount. The heaviest machine at Monaco weighed over 2,000 pounds. This machine, of the flying-boat type, did not, however, succeed in rising from the water. There were several machines which, fitted with a 100 horse power motor instead of an 80, for example, were also unable to rise from the water because the extra weight submerged the floats too much.

(Continued on Page 113)

ARMY AEROPLANE ACCIDENTS

By HENRY M. ARNOLD, First Lieutenant, Infantry

SINCE the last fatal aeroplane accident in our government service, in which Lieutenant J. D. Park lost his life near Los Angeles, Cal., on the 9th of May, attention has again been invited to the large number of casualties which have followed aviation in our military service.

Some rather startling statements of percentages have followed, but before relying too much upon these it may be well to note that our misfortune in having a number of casualties occurring closely together, combined with the very small number of aviators which we have in our service, would greatly exaggerate our situation in this respect. A far more useful comparison might be made when we consider the average number of hours in the air and miles covered per aviator. It is admitted that the percentage of casualties in our service is high, since six of our officers have lost their lives, beginning with Lieutenant Thomas E. Selfridge in the preliminary trials of our first military aeroplane at Fort Myer, Va., in the autumn of 1908. When we examine our records in connection with the only other nation from which exact data is available (England), we find that our aviators average nearly twice the number of hours in the air and miles covered per aviator.

The data from France includes pilots of all kinds and consequently does not furnish a basis for estimate. If we consider simply percentages of losses, Italy is ahead of us in the mournful statistics, while England is very close. There is one thing which an examination of the statistics presents, and that is, the greater percentage of casualties occur in the first few flying months, after which there is a marked falling off. This fact alone gives France a great relative advantage, since her officers have been under training for periods that average much longer than our own. Due to the exigencies of the service, very few of our officers have been available for long periods of training in aviation.

When it is considered that the United States has been able to furnish so few of her officers for this service, and that such modest equipment has been provided, the records of aviation in our service are causes for congratulation, rather than commiseration. Unfortunately, casualties are given much more prominent places in our publications than the praiseworthy achievements.

If we regard the latter, and recognize that aeronautics has risen to an important place among the great war establishments of all military nations, it will no doubt be admitted that it is worth the cost, regrettable as it may be.

Remarkable map made by the late 1st Lieut. Jos. D. Park at the same time he was piloting the aeroplane.

Tests for the "Military Aviator's" Certificate.

1. Make a cross-country flight of at least 20 miles (10 miles going and 10 miles returning), minimum height 1,000 feet.
2. Make a flight of at least five minutes' duration with the wind blowing at the rate of at least 15 miles per hour.
3. Carry a passenger to a height of at least 500 feet and, on landing, come to rest within 150 feet of a previously designated point, the engine being completely cut off prior to touching the ground. The combined weight of the passenger and pilot must be at least 250 pounds.
4. Execute a volplane from an altitude of at least 500 feet with the engine completely cut off, and cause the aeroplane to come to rest within 300 feet of a previously designated point on the ground.
5. Make a military reconnaissance flight of at least 20 miles for the purpose of observing and bringing back information concerning features of the ground or other matter which the applicant is instructed to report upon. This flight must be made at an average altitude of 1,500 feet.

Officers with "Military Aviator's" Certificate.

	Present Station	When Obtained
2nd Lt. T. DeW. Milling, 15th Cav.	Texas City, Tex.	July, 1912
1st Lt. H. H. Arnold, Infantry	College Park, Md.	July, 1912
Capt. C. DeF. Chandler, S. C.	Manila, P. I.	July, 1912
Capt. P. W. Beck, 17th Infantry	Ft. McPherson, Ga.	July, 1912
1st Lt. B. D. Foulois, 7th Infantry	Galveston, Tex.	July, 1912
1st Lt. Harold Geiger, C. A. C.	San Diego, Cal.	Nov. 8, 1912
1st Lt. L. E. Goodier, C. A. C.	San Diego, Cal.	Feb. 14, 1913
1st Lt. R. C. Kirtland, 14th Infantry	Texas City, Tex.	Jan. 17, 1913
1st Lt. S. H. McLeary, C. A. C.	Ft. Hunt, Va.	Mar. 11, 1913
2nd Lt. L. H. Brereton, C. A. C.	San Diego, Cal.	Mar. 27, 1913

McCORMICK FLYING BOAT

By LYMAN J. SEELY

LYMAN J. SEELY is one of the best known men in the aeronautical industry in the United States. For several years he was the principal owner and manager of the Elbridge Engine Company, and through his efforts the Elbridge engine had an exceptionally large sale throughout the United States and other countries up to about a year or two ago. He also spent some little time experimenting with aeroplanes. Mr. Seely now has charge of the motor and the publicity end of the Curtiss Aeroplane Company and Aircraft can vouch for it that from the publicity end at least, he is a great success. Before entering the aeronautical movement, Mr. Seely built marine engines with a great deal of success and prior to that time spent five years in journalistic work. He is a lover of music, and the fine arts, and devoted several years to European study before he succumbed to the fascination of the aviation "game." His creed is: "I believe in the Flying Boat, as it is, was, and must be,-as the fastest, safest and most comfortable means of transportation known to man."

OF the three different models of special Flying Boats turned out last month by Glenn H. Curtiss that one designed for Harold F. McCormick differs most radically from previous models, and has received a great deal of attention from the press of the country. Part of this was no doubt due to the prominence of the purchaser, and much of it to the fact that this was the first Flying Boat designed throughout for four passengers.

There were several reasons for making this machine of the tractor type. One of them undoubtedly was that at the time it was designed Mr. Curtiss had been conducting some very satisfactory tests with the big military tractor, delivered to the army aviators during the winter. This machine had shown itself not only a fine weight carrier, but also speedy and easily handled. The tractor type had the further advantage of giving the propeller draft direct to the radiator, an important point in a machine which it is expected will be run on the water much of the time.

As Lake Michigan has no reputation as a mill pond special attention was paid in the design of the McCormick hull to protecting the passengers from wind and rough water. Some people say the boat looks like a Doge's slipper, with the addition of a long, pointed heel. The toe of the slipper is low and pointed, with the idea of driving through rough water at low speeds. Six feet back from the bow the sides of the cockpit spring abruptly from the low pontoon, affording comfortable housing for the passengers. While seating accommodations are provided for four people, the balance of the machine seems not to be affected when one, two or three people are carried. The cockpit is provided with the gauges, etc., now regarded as standard equipment in most first-class flying machines. It has a further innovation in the form of a folding wind-shield of transparent celluloid. Cockpit is 4 ft. by 7 ft.

The aeroplane surfaces are similar to those on the Curtiss military tractor recently described in Aircraft. They are of one-piece design, readily demountable by the removal of four bolts. The principal dimensions are:

Spread of wings alone	38 ft. 4 in.
Spread over ailerons	41 ft. 8 in.
Depth of wings, "chord"	5 ft. 6 in.
Gap	5 ft. 6 in.
Length of tail	12 ft.
Width of tail	11 ft. 6 in.

Either or both of the passengers on the forward seat can handle the machine, which is equipped with the Curtiss dual system of controls. With this system operators can use the ailerons in unison, or either yoke may be instantly disconnected by the simple turning of a handle. The Curtiss Flying Boat has had one little looked for result in calling to the attention of men accustomed to the use of the lever operated warping control the advantages of the Curtiss shoulder yoke and the quick action of the ailerons. No less than four well known fliers of warp controlled machines have, during the past month, stated their preference for the Curtiss system. One of them, Marshall E. Reid, learned in seventeen minutes of actual flying to handle his Curtiss Flying Boat, though for nearly two years he has been using the other system of control.

One of the new Curtiss O-X 90-100 h. p. motors forms the center of the power plant. This is direct connected to a special tractor wheel 8 ft. 6 in. in diameter, turning approximately 1350 r. p. m. Safety starting crank and carbureter are within easy reach of the operator.

Mr. Curtiss conducted the trials of the McCormick boat, flying her first alone, then with two passengers, and finally taking the full complement of four passengers. Both on the water and in the air the craft behaved admirably. She proved faster than had been anticipated, and climbed strong. Mr. McCormick recently visited the Curtiss plant, examined the new craft and expressed himself as well pleased with her. C. C. Witmer, just returned from a year of water flying in European military camps, will have charge of the McCormick boat, which is now about ready for shipment to Chicago.

Another flying boat of more than passing interest is the Curtiss machine recently delivered to L. A. Vilas, of Chicago. This is a two-passenger boat, with a new type of hull. It is wider than any previous model, and is the solidest-looking flying machine,—and perhaps the heaviest,—ever used. Mr. Vilas flew for his pilot license with it three days after it was delivered to him on Lake Keuka. A similar hull is under way for the U. S. Navy, and still another, with seating arrangements for four, is now ready for J. B. R. Verplanck. A third model is represented by the very fast three-passenger Flying Boat delivered to G. M. Heckscher, of New York. This is undoubtedly the fastest thing that travels the water; those who have timed it claim that it makes better than sixty miles per hour on the water.

THREE VIEWS OF HAROLD McCORMICK'S NEW CURTISS FLYING BOAT

EDITORIAL

TO THE STATES: HANDS OFF!

AIRCRAFT has led all other publications in discussion of the application of law to the air. In this issue we publish another law, that of Massachusetts, designed to control aviation. Before Congress is a bill providing for similar national regulation; Great Britain already has two general laws; France has a decree and is preparing to enact a law. Customs and other regulations of aircraft are numerous. The situation that we foresaw four years ago is coming to pass: the laws of the earth are being extended to the air.

It is perfectly proper, even necessary, that aircraft should be controlled by the territory over whose surface they fly; but where should the control lie? Should the state, the nation or the family of nations define the control? Connecticut and Massachusetts have replied in part, and several other states are trying to make the same answer.. Congress is considering a bill, which will probably rest in committee until next winter. Internationally there exists a Juridic Committee on the subject and a preliminary diplomatic conference has been held. Evidently the control is going to lie where action is first secured, and the states are getting first action.

Barring the fees, which are inevitable, there is nothing in the Massachusetts law which is objectionable, except itself. What we need, since legislation is bound to come and international action will lag after national action, is a Federal law; and that Federal law should conform in all important respects to the best decisions of the International Juridic Committee, which is composed of the foremost legal personages of Europe and has an American representation. Every person interested in aviation should lend his personal influence to discourage state legislation. Why? Because the aircraft is the most mobile mechanism for locomotion in the world, and its field is the world, not any territory a whit less extensive. In the days when railroading began, they built lines 10 or 15 miles long and thought they had railroads. To go from New York to Buffalo required a dozen or more changes and untold wear and tear on temper and time. To go from New York to Chicago was a week's work, worse than any week's work one could do in an office. People of those days thought a railroad was a neighborhood affair. They acted toward it accordingly; counties passed regulations and held up the railroads of other counties that wanted to come in; states acted likewise; and the railroad fulfilled a very small portion of its legitimate service and purpose. Then some clear-sighted capitalists decided that if a man could and did go from New York to Chicago by two dozen lines, he would rather go by one; and interstate lines were thereby born. The states tried some holding up, but the proposition was too big for them to stand in the way, and the nation took control.

Yet a railroad is as far behind an aircraft as the stage coach is behind the railroad The railroad is an expensive thing of cars and engines with a tremendously expensive trackage. Aircraft need no track; it is all the same to them whether they travel over one county or the other, one state or the other, one country or the other. A boundary for them is only a theoretical barrier. An aircraft in a few days can be in half the states of the country. Diverse legislation, various regulations under such conditions can serve no good purpose for an aviator, and none for the enacting state, unless it should adopt the confiscatory principle of charging a fee against every machine entering its territory. Short of that impossibility, the diverse regulations which would be inevitable if individual states generally should pass laws could only have the effect of encouraging violations. Every aviator would have to be a lawyer to avoid unintentional violations of law, and an expert on geography that he might know to an inch in what state he was at the moment and what regulations were in effect.

The only practicable legislation on aerial locomotion is that which covers the widest possible territory. An international law is better than a national, a national than a state. The national law is a possibility of the present. Regulation, even with the coming boom in aviation taken into consideration, is not a pressing necessity; and therefore the states should await Federal action. For, the matter of registration fees aside, no two state laws would be much alike and would simply lead to confounding and confounded confusion. Differences between national laws will be bad enough when in a few years one wants to take a run from New York to Buenos Ayres or London or Paris. Let the states leave aeronautical legislation to the Washington Government and legislate into laws nothing more than fee regulations. Congress could do no better than pattern its bill after the French decree of 1911, published two years ago in AIRCRAFT.

THE FLYING BOAT CRAZE.

That the forerunner of a flying boat craze has already put in an appearance on both sides of the Atlantic is now quite apparent to everyone who takes more than a passing interest in the development of the aeronautical movement. And right here it must be understood that America not only leads any other country in its development but has at the present time more builders of successful flying boats than all of the other countries in the world combined. This is not an American boast either but a real live fact. The reader must understand clearly, however, that we are talking about flying boats only and do not include the hydro-aeroplane which is a separate and distinct type of air-water craft.

There are a great many builders of hydro-aeroplanes in Europe who apparently prefer the air-float to the air-boat, but it is safe to predict that the greater number of them will shortly recognize the fact that a boat with wings is far superior to an aeroplane with floats and accordingly turn their attention to the manufacture of the flying boat.

It is to be hoped, however, that American manufacturers now having the lead in this particular field will not only retain that lead indefinitely but try to increase it with each passing year until American made flying boats may be seen upon every body of water, either large or small, upon the face of the earth.

While it is a fact that the United States government has been lamentably weak in affording aid to the American aeroplane industry in comparison to the European and Asiatic governments, still we can look forward to an enormous patronage from the sport loving public once that public realize the great superiority of aircraft over water or land craft.

After all it was the rich young sports of America who actually built up the automobile and motorboat industries in this country through their craze for speed and by purchasing these vehicles for amusement and thereby furnishing the manufacturers with the necessary money to enlarge their plants and improve their machines. "Rich young fools" they used to be called, but a few thousand of these rich young sports with their attention turned to the flying boat nowadays in the shape of purchases of air boats for amusement, would furnish the backbone of a budding industry and would aid more in the improvement of air machines and the development of the science of airology than any other agency, and these rich young chaps with a craze for speed must really go up in the air to get it for the air boat can run away from a motorboat as easily as a humming bird can run away from a spider.

Furthermore, an air boat travelling at the rate of 60 or 70 miles an hour is safer and far more comfortable than a motorboat travelling at 35 or 40 miles an hour.

Once these facts are demonstrated and understood by the average American speed sportsmen there will not be a lake, river or body of water of any description that will not have its swarm of flying boats. And America will prove the best field in the world for the sale of the flying boats just as it has proved to be the best field in the world for the sale of motorboats, owing to its many great lakes, rivers, gulfs, bays, etc.

For several years Aircraft has been advising its readers to take up aeronautical work as a life work and not to mind the old fogies with one foot in the grave and rheumatic minds who preach against it.. We still advise our readers to get into the movement in earnest and fill whatever parts they are best fitted for and be ready to catch the big plums that will surely fall when the industry is ripened by the injection of large capital into it a little later on.

Sooner or later there is going to be some great waves of aeronautical prosperity in this country, and it looks now as if the first wave was just coming in via the flying boat route.

933 MILES IN 13 HOURS.

In competing for the Pommery Cup for the longest flight across country between sunrise and sunset in one day (with or without stops), on June 10th, Marcel G. Brindejonc des Moulinais beat all cross country records by flying from Paris, France, to Warsaw, Poland, by way of Berlin, Germany, a distance approximating 933 miles, in 13 hours. As he rested in Berlin for 3½ hours, however, it cut his actual flying time down to 9½ hours, which made his average flying speed approximately 97 miles per hour for the trip. In fact, his speed average should really be considerably over 100 miles an hour, owing to his loss of much time hunting for Wanna in a heavy fog.

When it is understood that the fastest express train takes 18 hours for a trip between Paris and Berlin, or the fastest train direct between Paris and Warsaw consumes 27 hours, the relative value in speed between railroad and air transportation can be gauged.

Including stops Brindejonc des Moulinais cut the fastest train speed between Paris and Warsaw in two. In other words, he accomplished in 13 hours what the railroad train requires 27 hours to do. There were times when, by taking advantage of the wind currents, Brindejonc des Moulinais made a speed of 140 miles per hour.

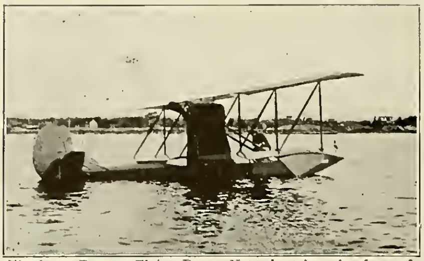
This remarkable over land flight brings out strongly two particular points: (1) that long distance air transportation must eventually supersede the slower going land transportation and (2) that over land flying is by no means going to be relegated to the rear by over water flying. In fact it is our opinion that there will eventually be more over land flying machines by a large percentage than over water machines, for the simple reason that there is a larger percentage of over land than over water traffic throughout the world.

This trip also demonstrated the fact that the weather will eventually have little or no effect upon flying either over land or over water, for even with the incomplete and extremely light machines of the present day Brindejonc des Moulinais flew in a wind which at times raged over 40 miles an hour, both with and against it.

ALL THE WORLD'S FLYING BOATS

With Comments on the Sport of Water Flying, Some Criticisms of Present Day Machines and Descriptions of All the Leading Types

By WALTER H. PHIPPS



The latest Burgess Flying Boat. Note the triangular form of mounting of the struts with the top planes attached along the front spar only.

That the advent of the flying boat will be the means of popularizing aviation and establishing it as a sport far surpassing motorboating and yachting is apparent to those who have given the subject the slightest attention. Already we find a number of the leading sportsmen taking it up and each enthusiastically declaring that it excels all other sports and prophesying a great future for it.

Most of the leading aeroplane manufacturers have already recognized the flying boat's possibilities and have turned their attention to this type of craft and some of the most progressive of them have already sold a number of these air water craft. The prospects of the flying boat industry developing into a tremendous and almost undreamed of commercial success now seems assured. And why should this not be the case? It has long been realized that if flying was to become a popular sport it would have to be safer than is overland flying to-day, for while land flying under favorable conditions is neither extremely dangerous or difficult, it is always attended by a certain amount of risk, and no matter how good the machine or how skilful the operator, there is always the possibility of his being forced to make a quick landing by the failure of the motor, and as it is not always possible to find good landing spots, occasional smashes are inevitable.

With the flying boat, however, this is not the case, for it is always possible when flying over water to alight safely on its surface. In addition, it is not necessary when flying over large expanses of water to keep at a considerable height, in fact just as much speed and enjoyment can be attained in water flying by keeping at a height of only 5 or 10 feet, in which case should the motor stop or anything go wrong with the machine or the pilot lose control for some reason or other, there is very little danger, for even should the machine fall from such a height little damage should be done. It is just this feature of being able to operate a flying boat a few feet above the water that gives the air water craft one of its chief advantages over the land flying machine, for it enables the beginner to gain experience and practice with practically no risks. Then again, for those who do not care to actually fly, the flying boat offers a means of water travel which is far faster and safer than high speed motorboating, and for this reason alone if none other it will speedily surpass motorboating and yachting as a sport.

Any sport to become popular must be reasonably safe and not too expensive and it is in these two factors that the flying boat is destined to excel and replace speed motor boats, for it is a well known fact that any speed motor boat is an exceedingly dangerous craft to operate by reason of the fact that the least misjudgment in taking a turn at high speed usually causes them to upset. With the flying boat, however, this is not the case, because the large wing spread of the craft, with its auxiliary floats placed at the tips of the wings, steady it laterally and prevent it from capsizing when making turns. In fact, sharp turns are purposely made by dragging one wing float in the water and pivoting the machine sharply around on the end float.

Then again, the cost of a flying boat will be considerably less than a high speed motorboat, for the reason that much less power is needed to attain high speed with a flying boat than with a motorboat which even if installed with engines of several hundred horse power cannot attain the speed of a 60-80 horse power flying boat of even the present day type, while when the air water flying craft is operated in the air no motor boat of no matter what price or horse power can possibly compete with it for speed, safety and control.

When it is taken into consideration that the flying boat can operate continuously on the water at greater speeds than the motorboats and can at will rise out of the water when confronted by obstacles such as breakwaters, docks, craft at anchor, etc., and can fly directly over them at increased speed while the motorboat must not only make long detours around them, but must slow up in doing so, it can readily be understood what a tremendous advantage even the present day flying boat offers over the regular high speed motorboat and it can be easily foreseen what a future there is for this newest and greatest of water craft.

The foregoing are just a few of the advantages of the present day types of flying boats which are still in an embryo state and just what perfections they will reach in the next few years it is hard to conceive of, for as with the automobile and motorboat once their advantages have been recognized and a big popular demand for them sets in, so many clever engineers, builders and designers will enter the new field that progress and perfection will come along at a rapid rate.

The sturdy Curtiss Flying Boat in flight. Note the substantial hull and generous size of main planes, elevators and rudder. Attention is also called to the position of the motor high up between the planes.

This perfection will only be achieved, as in other lines, through competition and popular demand, but it is always advisable to try and attain it as much as possible right from the beginning instead of waiting for the public to demand it and in no other line is this more necessary than in aviation, for, what with our sensational newspapers, whose delight is to publish only accidents, care must be taken in developing the new sport of water flying to keep it as free from failures and accidents as possible, and not give the newspapers a chance to hinder its growth, and this can best be accomplished by bringing the flying boats to a high state of perfection in the shortest possible time, and right now is the time to look into this matter from all possible angles, so as to determine some of the shortcomings of the present day types and find out some of the immediate changes and needs which are necessary to hasten perfection and make water flying a still safer and more pleasurable sport.

In some of our present day types a great state of efficiency has already been reached and doubtless some of the changes and criticisms here voiced are receiving the builders' attention. At any rate there is no harm in calling attention to some of the most important of them which in the writer's opinion are already necessary and can easily be made and therefore for the good of the movement in general and the manufacturers in particular they should be given immediate consideration.

The most crying needs of the flying boat problem to-day are safety, seaworthiness, the ability to ride at anchor or navigate with the wings reefed or folded, and last but not least, reliability.

Now let us analyze these needs and see whether or not the present day types of flying boats meet all these requirements and if so just how and to what extent.

First let us take safety: Here we find it hard to discriminate, as each maker naturally thinks that his type is the safest and as there are several different types they all cannot have the same degree of safety, so we can only study the cases and try and determine which type has the most merits. In some cases we find flying boats fitted with long narrow boat bodies having stubby noses and the engines placed down in the boat. In others we find machines using similar boats but carrying the engine high up in the frame of the aeroplane. Here to begin with we have two different types having widely different distributions of weight, the advocates of each type proclaiming their respective advantages. In other cases we find the hulls having long bows and carrying the pilot and passenger seated tandemwise, while still again we see another type having a curled up bow and engine placed up above it and the pilot and passenger sitting well to the rear.

From the foregoing we see several different types of flying boats using various shapes and kinds of hulls, all of which fly more or less successfully, and now the question is to determine which has

Detail view of the early Benoist Flying Boat. In later models the ailerons are fitted at the rear of the planes and a small fixed tail plane has been added. The motor, which is now a Sturtevant, is still carried in the hull, but the propeller position has been lowered somewhat.

the most advantages and this is something of a problem, but nevertheless, if only to draw attention to the matter and to promote discussion, let us try and analyze the case from a purely disinterested standpoint and endeavor to find out which type is likely to be the safest.

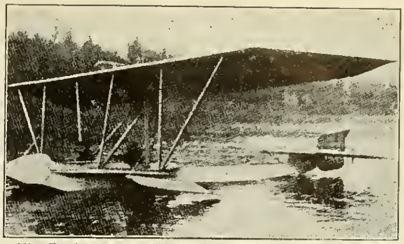
If a machine is to be used mostly as a boat there is not the slightest doubt that it is a good plan to place the motor way down in the hull where it steadies the craft on the water, but on the other hand if a machine is intended to be used mostly as a flying craft a great many would prefer to have the motor placed high up as is done in many cases. Of course this is a matter of opinion, but in speaking with a number of aviators it will be found that the majority favor flying a machine with a fairly high centre of gravity and one of our well known aviators in recently discussing the problem with the writer stated that he would not think of operating a low centre of gravity machine. Against this we have as a direct statement of some who have flown flying boats with the engine low down that they handle as easily as the other type and here again we run up against contradictions.

At any rate, both types have their certain advantages and from a flying standpoint the high centre of gravity machine undoubtedly has the advantage in the number of its adherents and this proves conclusively that from a flying standpoint the high centre of gravity type has the preference. Now with the flying boat we have presented the great difficulty, viz., that the arrangement of weight distribution which provides greatest stability on the water is likely in the opinion of many to destroy or, at any rate, hamper it in the air, then again, with the flying boat, thrust position plays a great part in the safety and balance of the craft and unfortunately at present, owing to the method of constructing present day flying boats, the propeller has had to be placed high up between the planes to clear the hull, so that in all cases we find a very poor aerodynamic arrangement of thrust in its relation to resistance and weight, which, as is well known, should all be as nearly in a line as it is possible to get them. For these reasons and after a careful study of the whole problem the writer does not hesitate to state again as he previously did in the February, 1913, issue of AIRCRAFT, that in order to secure the safest and most efficient type of flying boat it will be necessary to centre up the thrust of the propeller coincident with the centres of weight and resistance, and this can best be done by striking a medium between the low centre of gravity and high centre of gravity types of machines and above all things getting the thrust of the propeller down more in line with the centre of resistance and weight where it will not effect the balance of the craft if the engine stops or is switched on or off while in flight. Gaudart's recent accident in the D'Artois flying boat at Monaco proves conclusively the danger of this high thrust combined with a low centre of weight and resistance, for once he had made the mistake of switching on and off in endeavoring to clear some boats that were in his way, he got his machine pitching and rocking so that he was unable to control it and it fell over sideways and plunged into the sea from a relatively small height.

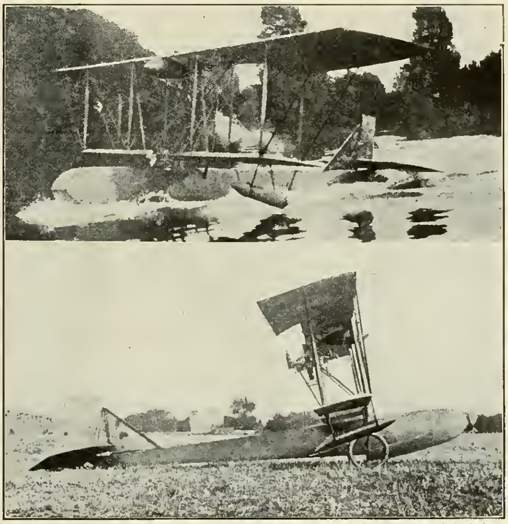
The foregoing are just a few of the criticisms and suggestions in regard to the safety problem of the flying boat and they are offered to call attention to some of the immediate needs of this type of craft and to stimulate thought in this line.

We have spoken of the weight distribution and thrust position and its relation to the safety of the air water craft, now let us consider the hulls themselves and their bearing upon this vital point.

We find a great many of the present day flying boats with such small bows and small freeboard that it is doubtful if they could live even in the easiest of seas. What is needed is flying boats fitted with hulls of such size and strength that they can handle rough weather with safety and comfort to the occupants. In this respect they must, as do the seagoing high speed motorboats, have sufficient length of bow to ride the waves and not plunge from one down into another and have it curl up over the bow, swamping the boat and drenching the occupants, which, if such occurred while traveling at high speed or in landing, would undoubtedly injure the occupants and perhaps cause their being drowned. With the hull having a large, long nose so shaped that it will rise out of the water even when striking at a slight angle, a great improvement will have been made which would go a long way towards aiding safety and seaworthiness and do much to popularize the flying boat and speed along its commercial success.


The Denhaut type of flying boat which is now being manufactured by the Borel firm. Note the single uprights and very small bottom plane, also the position of the motor.

Perhaps the most immediate and greatest need of the present day flying boat is to make it capable of having the wings folded in so that it can be stored in boat houses or anchored in the open without the danger of it being blown away or severely wrecked if a big wind or storm should come up. This is also necessary from the safety and pleasure standpoint, for supposing the operator is out with a party of friends and wants to land somewhere on the shore where there is no beach or docking facilities, what can he do with the present rigid wing type? As regards the safety end of it, supposing he is caught in the middle of a large expanse of water with his motor dead and a big storm comes up, what chance has he with a rigid wing type which is likely to be almost lifted bodily from the water or at any rate blow about and be severely damaged with great danger to the occupants.


Two views of the Donnet-Leveque, one of the first successful flying boats. In the upper picture it is seen being piloted by Andre Beaumont on the water, while the lower one shows it equipped with its land chassis.

Turning now to a description of the flying boats themselves, we will begin by describing the leading American types.

BURGESS.

The new Burgess flying boat, although the first to be turned out by the Burgess Company and Curtis, is of sound design and has many original features which place it right up in the front rank of successful flying boats.

The hull is of novel design, having the bottom sloping backwards and downwards to a point just under the rear of the planes, from which it slopes sharply up to the tail without the use of a step. This is one of the main features of the Burgess hull construction whether for hydro-aeroplanes or flying boats and it is claimed that it permits of a quick rise from the water as the boat can run along and gain speed while resting on the front part of the hull, but will rise quickly out of the water when the elevator is turned up as the whole craft rocks backward on to the after portion of the hull, thus giving the planes a good lifting angle and taking the machine right out of the water. Another characteristic of the Burgess hull is its long bow which permits it to ride rough water without discomfort to the occupants who sit in front tandem fashion while the shortness of the rear part of the hull eliminates the drag and aids quick rising. The main planes are attached to the hull at a point a little ahead of its centre. The planes are of unique construction, the lower ones being rigid while the top ones are built up on a single steel tube so as to permit each wing being used for maintaining lateral control instead of the usual warping arrangement. The power plant consists of a 70 H. P. Renault driving through under gearing a large 9½ foot diameter two-bladed propeller, which necessitates placing the engine fairly high up. It would be interesting to see this machine fitted with a smaller diameter three-bladed propeller and the motor lowered and what effect it would have on the flying qualities as compared with the present arrangement. The whole power plant is constructed so as to be readily demountable. The general dimensions of the Burgess as well as of all the other air boats will be found in the accompanying table.

BENOIST.

The Benoist flying boats, which are made up in either one, two or three passenger types, are all of the low centre of gravity type, having the motors and passengers placed in the hull. These types of machines are exceptionally stable on the water and by reason of the ample size and efficient controls have proved themselves to be good flyers and for all-round sporting work are second to none. The hulls, which are of the single step type, have the step placed approximately under the centre of pressure and this arrangement combined with the excellent construction and design makes the machines very quick risers.

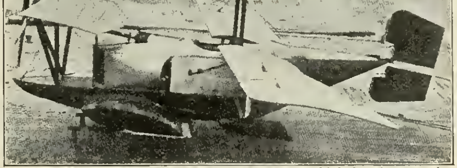
The main planes which are attached well forward on the hull and immediately in back of the pilot and passenger's cockpit, are of the standard Benoist type built up in sections. The tail and elevators which are attached to the rear of the hull by steel tubing and the rudder mast post, are of the regular Benoist flexing type and are very efficient. The power plant of the regular model is situated down in the hull and drives a large two-bladed propeller placed fairly high up between the planes through the medium of sprockets and chain. In the new model Benoist, however, a 70 H. P. Sturtevant motor is used and this is placed in the bow of the craft with the cockpit for the pilot and passengers situated in back between the planes. Propeller position is, however, approximately the same.

CURTISS.

The Curtiss flying boats are made in two models, one carrying the passengers in front and having the motor in the rear, while the other and newer type has the motor and propeller in front with the passengers' cockpit between the planes.

The standard Curtiss flying boat uses a large flat bottom single step hull carrying the pilot and passenger in front protected from wind and spray by a cowl. It carries the wings and motor just in back of the cockpit and a large tail plane, elevators and rudder at the rear. The step is placed approximately under the centre of pressure and the rear part of the hull slopes upward to eliminate drag and aid in quick rising. The power plant which is complete with radiator and starting crank, is placed high up between the planes and drives direct a large two bladed propeller. The wings are of standard Curtiss construction and use auxiliary wing tip floats to prevent capsizing on the water. Standard Curtiss control is used, there being two shoulder yokes and two steering wheels fitted so that both occupants can take turns in driving the machine if desired.

The new type Curtiss flying boat recently constructed for Harold F. McCormick, of Chicago, differs considerably from the former Curtiss flying boat design and in fact is quite different from any


The Breguet tandem-monoplane flying boat which has been undergoing experimental trials for some time and is now credited with having made successful flights.

G. M. Heckscher operating his new Curtiss racing flying boat on Lake Keuka at sixty miles an hour. Note the elevator held down to keep the machine in the water and also the absence of spray in front of the boat, which is just planing on the top of the water.

other type of flying boat so far constructed. From an aerodynamical standpoint it is a distinct advance over the other type as it has a considerably better distribution of weight, resistance and thrust in their proper relation to one another as pointed out above in this article, and its success in recent trials seems to justify and bear out some of the ideas advanced in the foregoing. The hull of the new craft is of distinctive type having a nose which is of shallow depth and, as we have repeatedly advocated, sharply curved up to prevent diving, while the after portion has a high cockpit and cowl built on to it and the position of the seats placed fairly high up, so that with the engine in this model somewhat lowered the mass of weight and resistance is more evenly distributed in relation to the point of thrust. As a detailed description of this new type is given on page 103 of this issue by Mr. Lyman J. Seeley of the Curtiss Company, there is no need to go into further detail here.

CHRISTOFFERSON.

The new Christofferson flying boat which is illustrated in an accompanying side view drawing represents some of the latest ideas in flying boat construction and its design has been worked out in a most careful and painstaking manner, with the result that its success in recent trials have fully justified the amount of labor and thought expended upon it.

The hull, which is slightly V-shaped on the bottom, is of unique design, deep and well proportioned in front and having the rear well swept up to eliminate drag. The position of the pilot and two passengers is in front and the main planes and the motor which is set on the top of the hull and not in the hull, as originally designed, is placed just in back of the passenger cockpit. This arrangement of placing the motor on the top of the hull was advocated by the writer in the February, 1913, issue of AIRCRAFT, and while it provoked some criticism by those in favor of keeping the motor down in the hull its success in the Christofferson craft substantiates the views expressed at that time. In pursuance of up-to-date biplane design the Christofferson flying boat has large overhanging top planes with the ends swept back and the ailerons placed along the whole extremity of each extension.

COLUMBIA.

The Columbia flying boat in general is more or less of conventional design but has a very flat hull and carries in teh front the seats for pilot and passenger and immediately beihnd the main planes with the motor between them and at the extreme rear the rudder and tail planes.

KIRKHAM.

The Kirkham flying boat is of distinctive type and carries the motor in the front down in the hull with the passengers just behind. In other respects it is of more or less standard design but embodies many new constructional features and is of excellent construction.

NELSON.

The Nelson flying boat is of more or less standard design and construction. It uses a flat bottomed single step hull which is quite large in front but tapers very perceptibly toward the rear. Pilot and passenger sit in front with the main planes and the motor which is placed high up between the planes just in the rear of them, while at the extreme stern of the boat there is attached the regular elevator and rudder.

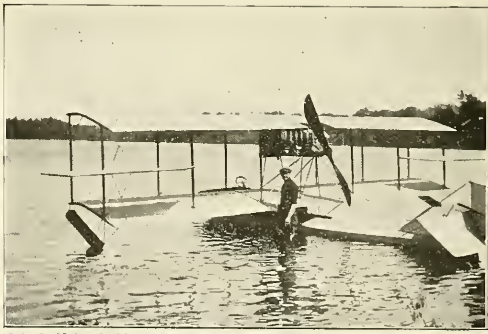
SLOANE.

The Sloane flying boat makes use of a special hydro-plane hull designed specially for this machine by Mr. William Gardner, the famous yacht designer who produced the "Atlantic" which won the Emperor's Cup in the transatlantic race. The main planes which are of a type similar to those shown on the suggested biplane run in the March, 1913, issue of AIRCRAFT, page 15, make use of the Deperdussin curve and have large overhanging top extensions.

THOMAS.

The Thomas flying boat is of the single step flat bottomed hull type carrying the pilot and passengers in front with main planes immediately behind and the motor and three-bladed propeller almost in the centre to bring down the position of the weight. At the extreme rear of the hull which is slightly swept upward is carried the small tail plane and large twin elevators with the big

L. A. Vilas, of Chicago, and his new Curtiss flying boat, which is one of the finest finished craft ever constructed, having the metal work braces, engine section, controls and other parts silver plated. The neat bucket seats are upholstered in soft dove-colored corduroy; in fact, the whole of the cockpit is fitted out like a luxurious landaulet, while the boat and all the woodwork have been painted with the same care and finish as is found on high-class automobiles.



Nels J. Nelson's biplane flying boat with which he has done some good flying lately in Connecticut.

Grover C. Loening's monoplane flying boat with which he has been experimenting since 1911.

combination air and water rudder between them.

WALCO.

The Walco flying boat is one of the most interesting air-water craft so far turned out. It is not only an attempt to evolve a sea-going flying boat, but also an attempt to produce a practical flying craft using tandem single planes set one at each end of the boat and supporting most of the weight between. They are arranged with the front one set at a greater angle than the rear one, so as to give as near as possible automatic longitudinal stability. The hull itself consists of a large single step V-bottom boat 20 feet long with a greatest depth and width of almost four feet. The motor and four seats for the occupants are placed down in the hull and slightly to the rear of the front plane. Behind the seats and on top is found the propeller, while at the extreme rear is the back main plane and the combination air and water rudders. This is one of the few machines which, as advocated in AIRCRAFT, has the planes so arranged that they can be quickly folded in and the craft used as a motor boat.

FOREIGN FLYING BOATS.

Regarding the foreign flying boats, the Donnet-Leveque, which was the first successful foreign air-water craft, is of similar type to the regualr Curtiss flying boat, but mounts a Gnôme engine between the planes instead of the large water-cooled motor used on the American type. The bottom plane of the biplane cellule, however, is considerably smaller than the top one, as is general practice abroad. The stern of the hull is also more swept up than is standard practice here.

The Borel-Denhaut is of similar general outline to the Donnet-Leveque; in fact, its designer, M. Denhaut, was one of the original designers of the early Donnet-Leveque. It has practically no lower surface, however, and the hull being of somewhat a new and experimental shape, it has not as yet proved much of a success.

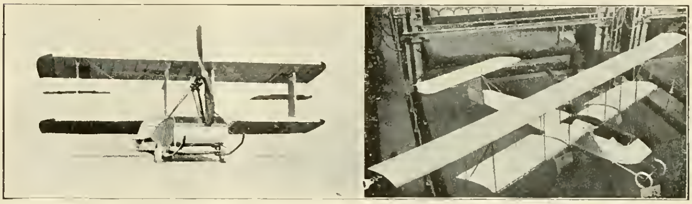
The Bréguet flying boat, which is of the tandem monoplane type, is of the shape shown in the accompanying photograph and drawing, and is of purely an experimental type, and while it is credited with having left the water, it will probably be evolved into a neater looking craft when M. Bréguet gets through with it.

The D'Artois flying boat, which caused the fatal accident to Louis Gaudart at Monaco, has a hull similar to the Donnet-Leveque, but carries pilot and motor in the hull.

The Curtiss-Paulhan craft, which have met with much success abroad, are simply French-built Curtiss flying boats using American Curtiss motors.

The English Sopwith flying boat, which consists simply of a large specially built boat hull to which the main planes and complete tail outriggers of a land biplane have been attached, has not up to the present proved to be a howling success owing to having been wrecked on the beach during its early trials. It has, however, now been repaired and is, we understand, flying successfully.

Two views of Tom Gunn's Flying Boat which was built in California by the Chinese aviator and which, together with several American machines, he has taken to China for school and military work.



Two novel French Flying Boats. On the left is the Bedelia—on the right the Sanchez-Besa.

TABLE OF SPECIFICATIONS OF THE WORLD'S LEADING FLYING BOATS

NAME	Type	Seats	Span	Length	Chord	Surface in sq. ft.	Motor	H. P.	Cycle	HULL Type	HULL Length	HULL Greatest Depth	HULL Width	Weight in lbs.	Speed M. P. H.	Price
AQUAERO (1)	----	----	----	----	----	----	----	----	--	----	----	----	----	----	----	----
BOLAND (2)	Biplane	----	----	----	----	----	----	----	--	----	----	----	----	----	----	----
BENOIST	Biplane	One	26' 6"	24' 0"	4' 8"	240	Optional	----	--	Flat, Single Step	22' 0"	20 in.	2' 2"	900	55	$2,700
	Biplane	Two	35' 0"	25' 0"	5' 0"	335	Sturtevant	70	6	Single Step	23' 0"	22 in.	3' 0"	1250	60	4,350
BURGESS (Navy Type / Sportsman's)	Biplane / Biplane	Two	43' 0"	31' 0"	5' 6"	397	Renault	70	8	Flat	29' 6"	----	----	----	----	----
CURTISS	Biplane	Two	36' 3"	26' 0"	5' 0"	290	Curtiss	80	8	One Step	24' 0"	46 in.	4' 6"	1300	60	6,000
	Biplane	Four	41' 0"	26' 0"	5' 0"	360	Curtiss	100	8	One Step	24' 0"	46 in.	4' 6"	1400	60-70	6,500
CHRISTOFFERSON	Biplane	Three	49' 0"	28' 3"	5' 6"	425	Hall-Scott ----	100 150	8 --	V Bottom, Single Step	24' 6"	32 in.	2' 10"	----	60	6,000
COLUMBIA	Biplane	Two	38' 0"	----	5' 10"	----	Gyro	80	7	Flat, with 3 steps	----	----	3' 0"	1070	60	----
COOKE	Biplane	Two	40' 0"	30' 0"	7' 0"	400	Roberts	75	6	V Bottom, Single Step	26' 0"	30 in.	4' 6"	1000	55	3,500
			30' 0" 42' 0"													
KIRKHAM	Biplane	Three	27' 0"	26' 6"	5' 6"	350	Kirkham	70	6	Single Step	24' 0"	26 in.	2' 7"	1200	55	4,000
MARTIN	Biplane	----	----	----	----	----	----	----	--	----	----	----	----	----	----	----
NELSON	Biplane	Two	29' 6"	26' 6"	4' 10"	284	Roberts	75	6	Single Step	23' 10"	32 in.	2' 10"	870	55	3,500
SLOANE	Biplane	Two	40' 0"	28' 0"	6' 0"	408	----	80	8	V Bottom, Single Step	25' 3"	28 in.	3' 9"	1100	60	5,500
THOMAS	Biplane	Two	37' 6"	25' 0"	5' 0"	310	Kirkham	70	6	Single Step	22' 0"	24 in.	2' 6"	1100	55-60	3,000
WALCO	T. Mono.	Four	32' 0"	22' 0"	5' 0"	280	Sturtevant	60-70	6	V Bottom, Single Step	20' 0"	42 in.	4' 0"	950	55-60	6,000
LOENING	Monoplane	One	30' 0"	24' 0"	6' 0"	160	Gnome	50	7	Fuselage	21' 0"	36 in.	2' 3"	700	60	----
PATERSON	Biplane	Two	48' 0"	27' 2"	5' 6"	444	Hall-Scott	80	8	----	25' 0"	----	3' 4"	1325	50-60	----
ATWOOD (3)	----	----	----	----	----	----	----	----	--	----	----	----	----	----	----	----
GALLAUDET (4)	----	----	----	----	----	----	----	----	--	----	----	----	----	----	----	----
FRANCE.																
BOREL (DENHAUT)	Mono-Bi.	Two	49' 3"	30' 10"	7' 0"	*350	Gnome	100	14	Flat	27' 10"	34 in.	3' 8"	----	----	----
BREGUET	T. Mono.	Two	45' 0"	34' 0"	6' 6"	----	Salmson	130	9	Flat	----	----	----	----	----	12,000
CURTISS-PAULHAN	Biplane	Two	37' 0"	26' 0"	5' 0"	350	Curtiss	80	8	Flat, Single Step	----	----	----	----	----	----
D'ARTOIS	Biplane	Two	----	----	----	----	Gnome	80	7	Flat	----	----	----	----	----	----
DONNET-LEVEQUE	Biplane	Two	31' 0"	29' 0" 20' 0"	5' 0"	----	Gnome	50 80	7	Flat, Single Step	26' 0"	----	----	----	----	----
BEDELIA	Biplane	Two	30' 0"	----	5' 6"	----	Gnome	70	7	Flat	----	----	----	----	----	----
SANCHEZ-BESA	Biplane	Two	----	----	----	----	Renault	70	8	Flat	----	----	----	----	----	----
CHINA.																
†GUNN	Biplane	Two	40' 0"	----	6' 0"	----	Hall-Scott	80	8	V Bottom, Single Step	25' 0"	30 in.	3' 4"	----	50-60	----
ENGLAND.																
SOPWITH	Biplane	Two	41' 0"	35' 4"	5' 6"	450	Austro-Daimler	90	6	Flat, Single Step	21' 0"	28 in.	4' 0"	----	50-55	8,250

(1) "Aquaero" is the name of a flying boat that was to have been built by the Aquaero Manufacturing Company of New London, Conn., recently organized by J. Fancuilli. Up to the present time, however, Aircraft has received no news nor data concerning this boat.

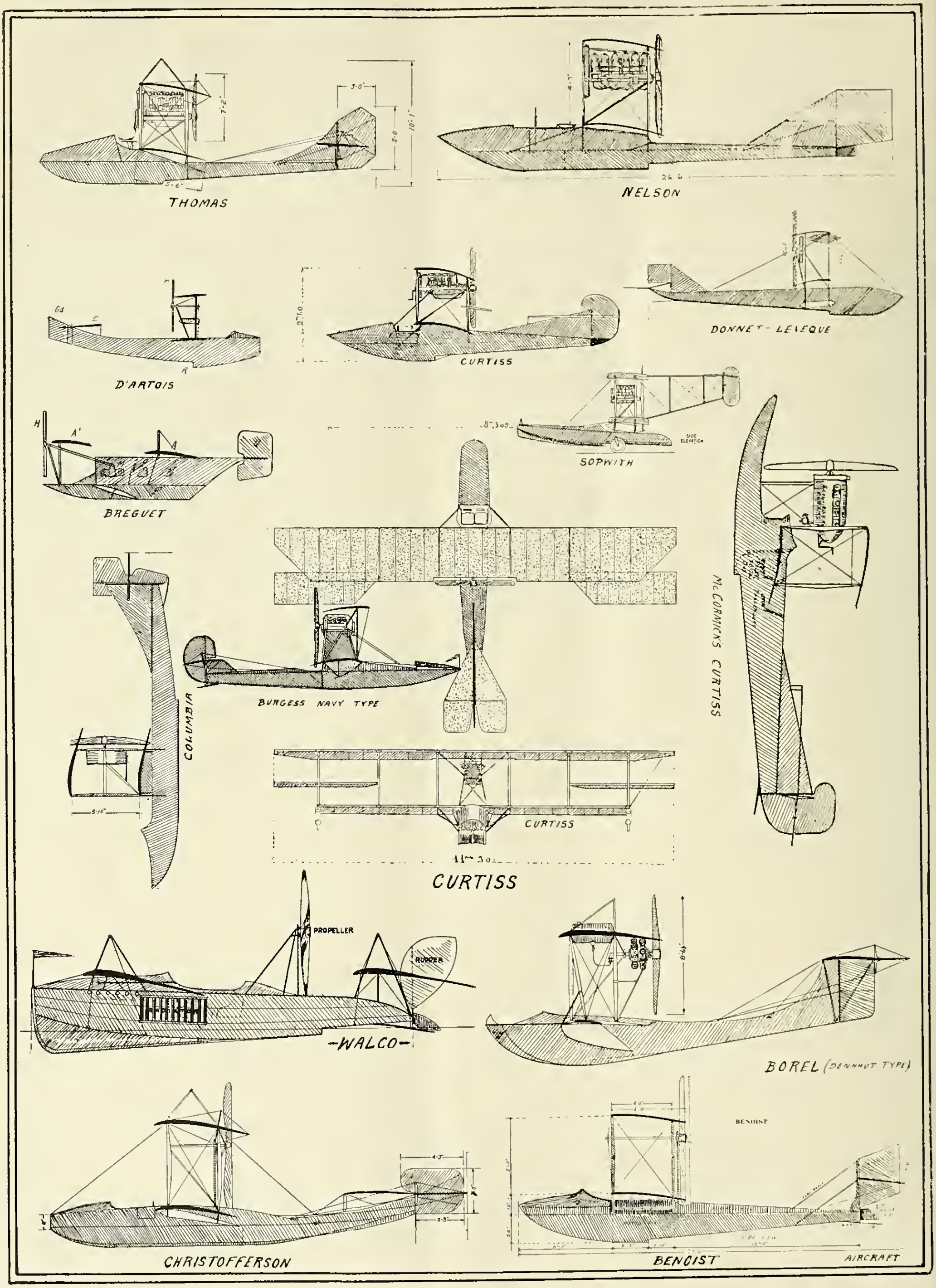
(2) The Boland Aeroplane and Motor Company inform Aircraft that they are not yet ready to give out the figures of their flying boat.

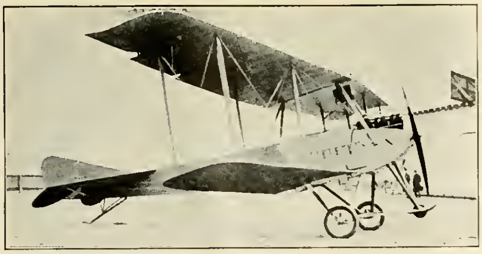
(3) Harry N Atwood has been experimenting with the Atwood flying boat on and over the waters of Lake Erie, but has notified Aircraft that he wishes to make some important changes before giving out the data concerning it.

(4) **The correct figures and data of the Gallaudet flying boat, now in course of construction at Norwich, Conn., are at present unavailable.**

*** Approximate.**

COMPARATIVE DRAWINGS OF ALL THE LEADING FLYING BOATS OF THE WORLD.




The new German L. V. G. Tractor Biplane. Note the simple landing chassis, streamline fuselage and backwardly sloping wings.

FOREIGN NEWS

BY

Arthur V. Prescott

Austria

After Count Zeppelin's recent visit to Vienna on board the "Sachsen," it was reported that the Austrian government had ordered six Zeppelins, but this report was later denied by Count Zeppelin, who stated that his company would construct dirigibles only for the German government or for use in Germany.

NEW WORLD'S ALTITUDE RECORD WITH THREE ABOARD.

During the International Aviation Meet at Vienna, June 15-22, Edmond Perreyon, the French Blériot pilot broke the world's record for an aeroplane carrying three people. With two companions Perreyon ascended 15,480 feet.

Brazil

The first American lady to fly in Brazil was Miss Margaret Fairchild, daughter of an American citizen living in Uraja, Santos, who recently made a successful flight at Rio Janeiro in a Blériot monoplane with the Brazilian aviator, Senor du Chaves.

BRAZIL ORDERS CURTISS MACHINE.

On June 13 a cable was received by Glenn Curtiss from Brazil for the immediate delivery of a flying boat. While the Curtiss people would give no information as to the real purchaser of the machine, it is said that recent letters received from Brazil indicate that it is intended for the use of one of the sons of President Hermes Fonseca. David McCulloch, the young American who has been operating one of the Curtiss water flying machines in South America, is said to have taken young Fonseca for a number of flights, and to have thoroughly interested him, as well as a number of government officials, in the possibilities of the machine.

England

AIRMEN GLIDE 1,200 FEET IN A BLAZING BIPLANE.

On May 26, while flying at Salisbury, the British aviators, Pizey and Fellows, had their biplane catch fire. Gliding from a height of 1,200 feet in their blazing machine, they succeeded in reaching the ground safely and escaped from the machine just as an explosion of the gasoline tank completely wrecked it.

HAWKER ON THE NEW SOPWITH TRACTOR ESTABLISHES NEW BRITISH HEIGHT RECORD.

On May 31 the new British height record was raised to approximately 11,300 feet, at Brooklands, by Harry Hawker, flying an 80 H. P. Sopwith tractor biplane.

France

FLIES AT RATE OF 111½ MILES AN HOUR.

On June 17th, flying around a 6 1-3 mile course at Rheims, Prevost attained a speed of 111½ miles an hour.

On June 19th Prevost made a 217-mile straight-away flight at a speed of 117 miles an hour.

NEW HEIGHT RECORD WITH PASSENGER.

On June 3, at Buc, Edmond Perreyon, the Blériot pilot, broke the height record for pilot and passenger by rising to a height of 16,368 feet. Perreyon also holds the world's altitude record for an aeroplane carrying only a pilot, having risen to a height of 19,685 feet at Buc on March 11th.

BRINDEJONC DES MOULINAIS FLIES NEARLY A THOUSAND MILES CROSS COUNTRY IN A DAY.

On June 10 the French aviator, Marcel Brindejonc des Moulinais, in his 80 H. P. Morane-Saulnier monoplane, beat all distance records for a cross-country flight by flying from Paris, France, to Warsaw, Poland, by way of Berlin, Germany, a distance of 1,500 kilometers, approximately 933 miles, in 13 hours, and, excluding stops, attained an average speed of about 97 miles an hour. For comment on this great flight, which was made in an attempt for the Pommery Cup, see editorial on page 105 of this issue.

AUDEMARS BEATS GARROS IN FLYING MATCH.

The contest for a prize of $2,000 for an aeroplane match of flying skill between the well-known aviators, Garros and Audemars, was held at Juvisy, Paris, and was won by Audemars. The prize was offered by a French constructor of aeroplanes for the best performance in three events. The first was a thirty mile race, each competitor using a machine of the same make, the same horse-power engines and starting at the same moment; the second an ascension test with a minimum height of 8,000 feet, and, third, skillful fancy flying.

GORDON BENNETT RACE TO BE HELD IN SEPTEMBER.

The International Aeroplane race for the Gordon Bennett Trophy will be held this year on September 27, 28 and 29. The race will be contested for at Rheims.

Germany

By Stella Bloch.

The German Air Bill is to be placed before the Diet before the year is out. It was intended to come up for debate last April, but a commission consisting of Count Zeppelin and Major von Parseval, as well as Dr. Nismaier, the well-known legal authority on aerial matters, among others, deemed the act incomplete, as it made no provisions for the landing of foreign airships and aeroplanes on German soil. Since this sitting the question has come into unusual prominence by the happenings at Luneville, in France, when "Z IV," and shortly afterwards a military aeroplane, made unintended and very awkward visits.

Steindorf, a young sergeant attached to the Strassburg military aviation station, achieved a remarkable performance on May 23rd, landing at Darmstadt in a volplane from an altitude of 1,200 metres with throttled motor. Steindorf was accompanied by another sergeant on his way to Gotha, where he effected a good landing.

The first National week at Berlin-Johannisthal this year commenced on Sunday, May 25, but the first few days were somewhat featureless and only rendered interesting by the struggles for the altitude passenger prize, which Michaelis (Etrich-Dove) won on the Sunday and Monday. On Tuesday morning he was put out of the running at a very early hour by an accident during a training spin; he sideslipped whilst taking a pylon and crashed down heavily. He was unconscious when conveyed to the hospital, where the doctors reported him to be suffering from a fractured thigh and ribs. The event of the meeting was young Linnekogel's new German altitude passenger record achieved on May 28th, when he rose to 2,750 metres with full war ballast and a passenger. Linnekogen, who is a Rumpler pilot, beat Hirth's previous record of 2,604 metres in so doing. The world's record of 4,360 metres is held by Lieut. von Blaschke, won during last year's Vienna meet.

ZEPPELIN FLIES FROM FRIEDRICHSHAFEN to VIENNA AND RETURN.

The Zeppelin airship, "Sachsen," with Count Zeppelin on board, flew from Friedrichshafen to Vienna on June 9, in the face of a severe storm. On June 10 it returned safely to its hangar at Friedrichshafen, on Lake Constance.

LIEUT. CANTER WINS PRINCE HENRY CONTEST WITH MERCEDES MOTOR.

In the Prince Henry Aviation Circuit, Lieut. Canter, in a Rumpler-Dove monoplane, with Mercedes aviation motor, was first receiving Emperor's and Prince Henry's prizes. Five Mercedes flyers received reliability prizes, while five others, also using Mercedes motors, won reconnoitering prizes.

SCHUETTE LANZ FIRM CONSTRUCTING LARGEST DIRIGIBLE.

The Schuette Lanz firm is at present constructing a rigid airship of even larger size than the latest Zeppelin and of greater estimated speed. Four motors of 200 H. P. each are to be fitted and will drive eight propellers. There will be five nacelles.

On June 15, Lieut. von Egan-Krieger, of the First Hussars, a well-known gentleman jockey, won the first race at Magdeburg, after which he mounted his aeroplane and flying to Berlin, a distance of 88 miles, he landed in the middle of the Grunewald race course, ran to the scales, weighed in, mounted his horse, which was entered in the fifth race, and won that also.

Italy

DEROY AND CEVASCO FLY 410 MILES.

On May 27th a flight from Milan to Rome, a distance of 410 miles, was made in a monoplane in six hours and seven minutes by the Italian aviators, Deroy and Cevasco. When they were passing near Pisa the King and Queen and the royal princes saw the aviators from their hunting lodge at San Rossore and followed their flight with field glasses.

FRENCH AVIATOR COVERS DISTANCE FROM TURIN TO ROME AND RETURN IN ITALIAN MONOPLANE.

The French aviator, Perreyon, with Dupuy, a mechanician, made a flight on May 28th from Turin to Rome and return (925 miles) in an Italian built Blériot monoplane fitted with a 80 H. P. Gnôme motor. Perreyon started at five minutes to five o'clock A. M., and arrived in Rome at half-past eleven o'clock. The return to Turin was made at twenty minutes past seven P. M. Blériot, who was waiting for the aviator, embraced him on his return, saying it was a record flight.

KING EMANUEL MAKES DIRIGIBLE TRIP.

On June 4th King Emanuel, of Italy, made an extended trip in one of the Italian military dirigibles, during the course of which the ship indulged in bomb-dropping practice. The King was highly interested in these experiments, and declared himself as greatly impressed with the military value of airships. King Emanuel is the first monarch to make an extended trip in an airship, although others have made short flights.

Russia

PARIS TO ST. PETERSBURG FLIGHT COMPLETED.

On June 10th Brindijonc des Moulinais completed the last stage of his 1,000 mile flight from Paris to St. Petersburg trip, by flying from Divorsk to St. Petersburg.

AVIATOR FLIES BIPLANE WITH FOUR 100 H. P. MOTORS.

At St. Petersburg, on May 24th, Sykorsky gave some exhibition flights on his giant biplane, which is fitted with four motors of 100 H. P. each.

Spain

A party of Spanish Army officers, headed by Captain Herrara, on April 24 visited Mourmelon and saw Bathiat fly the new Bathiat-Sanchez monoplane fitted with a Clerget rotary. They saw Lieut. Morel on one of these machines mount 1,500 metres in seven minutes and they also witnessed delivery tests of two monoplanes piloted by Tetard and Labarre.

Switzerland

Having arranged to fly at Aaron in the interests of the Swiss National Aviation Fund, to which nearly $75,000 has already been subscribed, Oscar Bider on April 22 flew over from Berne on his Blériot tandem in 45 minutes.

Turkey

It is reported that the Turkish Government has bought a small Parseval airship in the hopes of strengthening her aeronautical forces.

MODEL DEPARTMENT

By NICHOLAS S. SCHLOEDER

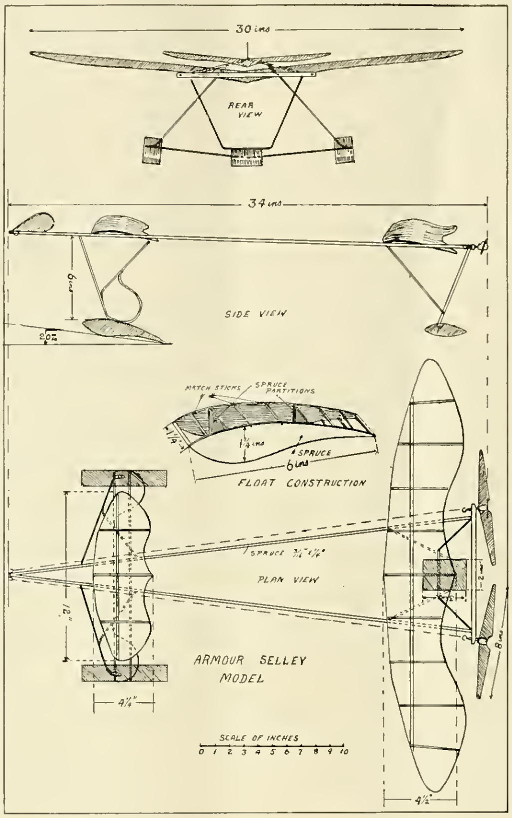
The drawing of the hydro-aeroplane which appears on this page is that of Armour Selley, the world's champion model flyer. This model has an official record of 53 seconds, more than double the official English record of 25 seconds. It has repeatedly done better than 40 seconds.

The fuselage, triangular in shape, consists of two pieces of 7/16x1/4 inch spruce 34 inches long with two pieces of bamboo used as bracing. The rear piece holding the bearings which are made of piano wire and brass tubing, consists of a strip of bamboo.

The pontoons are three in number, arranged and fastened on as shown in drawings. The front pontoons are each 6 inches long and 1 1/4 inches wide. The sides of the pontoon are of thin spruce boards cut to shape; they are held together by two vertical spruce partitions in addition to match sticks on top and bottom. A tough tan paper, known as bamboo fabric is stretched from one spruce side to the other, thus forming the bottom and top of the pontoon. The whole is covered with several coats of ambroid varnish making a neat water-tight compartment. The rear pontoon is 3 ins. long x 2 ins. wide.

The frame work of the main plane is built of spruce and bamboo covered by silk stretched and tightened in the usual way by applying a coat of varnish. The elevator in front measures 15 ins. x 4 1/4 ins. and the main plane 30x4 1/2 ins.

The propellers are cut out of white pine 8 ins. in diameter and have a pitch of 16 ins. and are driven by 10 strands of 8 ins. rubber. The total weight of the model is 5 1/4 ounces.



CLUB NOTES.

The N. Y. Model Aero Club, now in its fourth year, meets every Saturday night at the Grand Central Palace, 46th Street and Lexington Avenue. Charles L. Pagot is president. Lectures and scientific discussions are held at all meetings. An aeronautical library, donated by the members, consisting of magaines, textbooks and photographs, is at the disposal of all. This includes a complete set of all the numbers of AIRCRAFT beginning with the first issue.

Owing to the great interest shown in the Collins Contest, the monthly contest for May will not be held.

Extensive gliding is being done by the gliding section at Oakwood Heights, Staten Island, on Sunday afternoons. A Witteman glider is being used. There are no less than six gliders owned by the members. A perfect copy of a Wright type has just been completed by R. Holderman.

The Bay Ridge Model Aero Club which was recently organized, meets at the home of its president, Mr. W. Bamburger, 6730 Ridge Boulevard, every Saturday night. While the membersip is still small it is not lacking in efficiency, as is shown by the showing it has made in the Collins Contest.

TRACTOR MODELS.

Much difficulty was at first experienced with tractors in the way of longitudinal stability which led to their abandonment in the early stages of model flying in 1910. The trouble was that model flyers, in attempting to copy Blériot and Antoinettes, succeeded in only partially doing so, for, while the shape and size of the wings, fuselage, etc., was tolerably similar to their full-sized prototypes, in that most important thing of all, the distribution of weight, they failed utterly. As a general rule, the center of pressure of the main plane of full-sized machines varies but little from the center of gravity. In the models of those early experiments the center of gravity was considerably in back of the center of pressure of the main plane, which resulted in an aeroplane of the lifting tail type. This type is not successful when the angle of incidence necessary to support the tail must be greater than that of the main plane, as the model will fall tail first.

Furthermore, the automatic stability shown by the type which to-day represents 95 per cent. of the model aeroplanes built to fly had much to do with the entire disappearance of tractor machines for more than three years. In this type, briefly, a small plane or elevator is set at a greater angle of incidence to the line of flight than the rear or main plane, and the propellers are in the rear. Following adjustment, perfect longitudinal stability is obtained by their arrangement. In large machines this type is represented by the Canard, Cody, Valkyrie and others. Because of engineering and mechanical difficulties they are not as successful in full-sized machines as in models.

It was not until this year that the tractor models again made their appearance among the leaders in the model world. In the hands of experienced model flyers, surprising results have been obtained, especially with single propellers models, as flights closely approaching 1,500 feet have been made. C. Obst, of the L. I. M. A. C., has been most successful in this respect. F. Hodgeman, of Flatbush, Brooklyn, has also been very successful. Obst, in order to obtain stability, used upturned rear edges on the tips of main planes and a flat tail. Hodgeman used the non-lifting tail type, that is, a machine with a tail set at a negative angle with center of gravity slightly in front of the center of pressure of the main plane. With this type it is sometimes necessary to have the main plane set far back. This is no serious drawback, as the writer has made several successful flights with the main plane no less than 27 inches in back of the propeller, on a four-foot machine. An important thing to remember in constructing a tractor model is the necessity of using a vertical fin in the rear, to assist in stability.

THE FRANCIS A. COLLINS TROPHY.

The second of the series of contests for the trophy offered by Mr. Francis A. Collins, for inter-club competition, scheduled for April 20, was twice postponed on account of inclement weather, it being not finally held until Sunday, May 4. The contest, which was for distance launching from the hand, was won by the Long Island Model Aero Club, which, according to the regulations governing the competition, netted them twenty points. The Bay Ridge Model Aero Club was second with 14.6 points and the New York Model Aero Club third with 7.3 points.

L. Ness, of the Long Island Model Aero Club, sent his model a distance of 1,813 feet, while Obst and Obershield of the same club made marks 1,979 and 1,661 feet, respectively, resulting in a team average of 1,757 feet.

Olson, of the Bay Ridge Model Aero Club, made the best record of the day when his model landed 2,323 feet away from the starting point. W. Bamburger's model flew 1,522 feet. This gave the club an average of 1,271 feet. H. Billings was the only one who succeeded in making a flight on the team of the N. Y. M. A. C. His model traveled a distance of 1,946 feet. The models of Armour Selley and Harry Herzog broke down, and as three constitute a team, the club received a mark of only 628 feet.

The wet ground played havoc with the planes, loosening up the "stretch" of the material used in covering up the frame-work of the wings and otherwise reducing the chance of the models making a long flight. On the whole, however, the flying was fairly good. The standing of the clubs now is: N. Y. M. A. C., 27.3 points; Long Island, 25.33 points; Bay Ridge, 14.6 points, and Summit, 12.5 points.

The third contest for the Collins Trophy, for duration rising from the ground, was held on Sunday, May 24. The 20 points were awarded to the Bay Ridge M. A. C. The Long Island M. A. C. received 19.1 points, and the New York M. A. C. 5.2 points.

A new world's record was made by Walter Bamburger of Bay Ridge, when his model gracefully rose from the ground and circled about for 81 seconds, displacing the old record of 73 seconds

OFFICIAL RECORDS.

WORLD'S MODEL FLYING RECORDS.

			America.
Hand launched	Distance	Armour Selley	2,653 feet
	Duration	Armour Selley	158 4-5 sec.
Off ground	Distance	George Cavanagh	60 sec.
	Duration	Walter Bamburger	81 sec.
Hydro off water	Duration	Louis Bamburger	1,542 feet
			England.
Single tractor screws	Distance	H. R. Weston	252 feet
	Duration	F. W. Jannaway	22 sec.

AMERICAN MODEL FLYING RECORDS.

Hand launched	Distance	Armour Selley	2,653 feet
	Duration	Armour Selley	158 4-5 sec.
Off ground	Distance	Louis Bamburger	1,542 feet
	Duration	Walter Bamburger	81 sec.
Hydro off water	Duration	George Cavanagh	60 sec.

BRITISH MODEL FLYING RECORDS.

Hand launched	Distance	A. E. Woollard	1,431 feet
	Duration	A. F. Houlberg	89 sec.
Off ground	Distance	G. Roulands	696 feet
	Duration	A. F. Houlberg	51 sec.
Hydro off water	Duration	G. P. Bragg Smith	25 sec.
Single tractor screw	Distance	F. G. Hindsley	519 feet
Hand launched	Duration	J. E. Louch	44 sec.
Single tractor screw from ground	Duration	J. E. Louch	40 sec.

(All British records are quoted from "Flight")

made by Curtis Myers on October 20, last year.

The other flights follow: Bay Ridge—L. Bamburger, 31 1/3 secs; W. Heil, 50 secs. Long Island—C. Obst, 48 secs.; J. Cavanagh, 58 2/5 secs., and H. Schultz, 55 secs. New York—J. Billings, 43 secs.

The fourth contest for hydroaeroplanes, duration, was held in conjunction with the Aeronautical Society's Aviation Tournament on May 30, at Oakwood Heights, S. I. An oblong tank was built in front of the grand stand for starting the models.

The Bay Ridge Club again became entitled to the 20 points, the Long Island Club being second with 19 points and the New York M. A. C. last with 5.3 points.

The long-standing record of Armour Selley—53 seconds—was broken by George Cavanagh, of the Long Island group, with the extraordinary mark of 60 seconds.

An equally remarkable record was a flight of 28 seconds made by Harry Herzog, of the New York M. A. C. with a twin propeller tractor model. This is the only flight on record that has been successful with this type.

The fifth contest was again won by the Bay Ridge Club. The Long Island M. A. C. was again second and the New York M. A. C. third with marks of 14.4 and 6 points, respectively.

A new world's record was again made, the record of 1,408 feet, one of the many held by Armour Selley for distance from the ground, was the one to go this time. It was twice exceeded, once by C. Obst with 1,432 feet and finally by L. Bamburger with 1,542 feet.

As the first contest, held on April 6, was protested, the final standing has not as yet been decided.

THE POSSIBILITY OF TRANSATLANTIC FLIGHT

(*Continued from Page 101*)

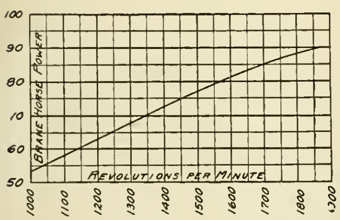
It is significant that no machine of the flying-boat type, that is, having a body below the planes in which the men and motor are placed, competed in the Prix de Monaco race. It is the opinion of Frank Coffyn, who has had more experience than any other American aviator with the twin float type of hydroaeroplane, that a sea-going machine should be of the float type and not of the flying-boat type, which is now coming into vogue. He believes that the latter type of machine would be readily swamped, whereas the float type would stand more chance of not sinking and of its pilot not being swept away by the waves.

The successful anchoring of his large Maurice Farman biplane in the harbor of Beaulieu by Gaubert when he saw that one of the other machines had been blown upon the rocks, demonstrates that if a forced descent is made in mid-ocean in a storm, some form of drag anchor could be used which would hold the aeroplane head on to the wind and seas, so that the seaworthy boat with which it should be fitted would ride the waves more easily than if it were in the trough of the sea. Furthermore, a method of reefing the cloth of the wings, or folding these, can easily be devised. In fact, the latter has been done already in one form as exemplified in the De Marcay monoplane. This machine and another small monoplane with streamline body were the only ones to ride out in the gale that occurred previous to the Monaco meet while they were moored in the harbor. All the other machines were taken under shelter.

The second chief argument of the airship experts against the possibility of crossing the Atlantic is that the flight should be made without a stop. As they do not know of any aeronautic motors capable of running forty hours continuously, their attention is called to the eight-cylinder V-type, Curtiss motor which recently ran that length of time in a test during which it developed full power and did not vary more than fifteen revolutions per minute throughout the entire run. The motors used on the Zeppelin airships have, we are told, made continuous runs of fifty hours' duration in tests, and they are known to have run continuously over thirty-one hours in the air. There is, therefore, no doubt that a reliable motor capable of propelling an aeroplane thirty to forty hours continuously can be had at the present time. As the two gentlemen admit that a mammoth machine with fuel sufficient for covering the entire distance without a stop and with several pilots to run it, will have a fair chance of making the flight, provided the motors hold out, we do not think more need be said. Just as Paulhan made the 180-mile flight from London to Manchester, less than five years ago, so will some American, we hope, make this 1,800-mile flight across the Atlantic Ocean. Lord Northcliffe, the donor of the prize to be given for accomplishing this feat, and who has given through his newspaper, The Daily Mail, $120,000 in prize money to aviation, expresses complete confidence that the day will yet arrive when over-sea travel will be accomplished almost entirely in the air.

TEST OF STURTEVANT AERONAUTICAL MOTOR

By H. N. BLISS

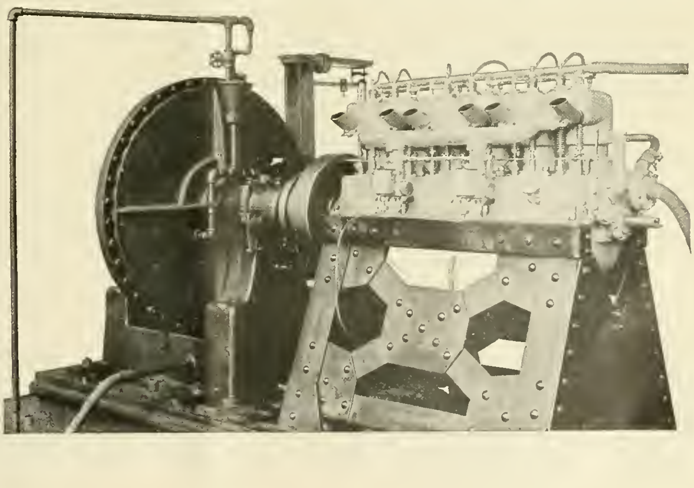


The B. F. Sturtevant Company recently conducted a very severe test on one of their six cylinder aeronautical motors. This motor was ordered by the Weckler-Armstrong-Lillie Company of Chicago, to be used in their new Walco Flying Boat on condition that it should perform a four hour non-stop run at 1,600 R. P. M. and develop not less than 80 H. P.

This test was witnessed by Mr. E. R. Armstrong of the Weckler-Armstrong-Lillie Company, and by Professor Albert A. Merrill, of Massachusetts Institute of Technology.

The motor was direct connected to a standard absorption water dynamometer as shown in the accompanying cut, and the dynamometer was supplied with water from a float feed tank in order to maintain as uniform supply as possible. The force exerted by the brake arm, which was 36 in. long, was registered on a Fairbanks platform scale. Ordinary "motor gasoline" was used which tested at 64.5° Beaume and this was supplied to the motor from a tank supported on scales by which means the fuel consumption during the run could be accurately determined. Cooling water was contained in a tank and kept at a temperature of 160° by means of an overflow pipe and a supply of cold water, thus approximating as nearly as possible the conditions when in service in an aeroplane. Sufficient oil for the entire run was contained in the pump of the motor, a measured amount being put in at the stop and the remainder drawn off and carefully measured at the end of the test so that the total oil consumption was determined in this manner.

The accompanying chart is a record of the readings taken at intervals of about every fifteen minutes throughout the test. On this chart is recorded the time, the revolutions per minute, the net pull recorded on the scales, and the horsepower derived from the Prony-brake formula of $\text{H. P.} = \frac{2\,W\,L\,N\,P}{33000}$ in which L is the length of the brake arm in feet; N, the number of revolutions per minute; and P, the pressure in pounds exerted by the brake arm on the scales. There is to be added to this a mechanical loss due to the friction in the two bearings of the dynamometer and this had previously been accurately determined by driving the dynamometer at 1600 R. P. M. by an electric motor of known efficiency, and the power required to do so was found to be 1.1 H. P. The last column of the chart shows the actual B. H. P. developed by the motor at each time that the readings were taken. It will be seen that the average of these readings shows 83. B. H. P. at an average speed of 1616 R. P. M. for the entire



period of four hours. The last reading was taken at exactly the same speed as the first and the drop in power was only .5 H. P. or .6% at the end of four hours. The total gasoline consumption for the entire run was 190# or 31.6 gallons, which works out to the excellent figure of .572# per horsepower hour while the oil consumption was but 2.5 gallons for the entire four hours at this extremely high speed.

Before starting the four hour test, the motor was run at various speeds and a number of horsepower readings taken from which a power curve was plotted as shown on the accompanying chart. This is a remarkably straight line curve and reached 90 H. P. at 1870 R. P. M. Such a curve is positive proof that the valves and inlet passages of the Sturtevant motor are properly proportioned to obtain maximum efficiency and it is also interesting to note that throughout these widely varying speeds, no adjustments were made to the carburetors.

It will be seen on the accompanying cut that the Sturtevant motor is fitted with two Zenith Carburetors in which the throttle valves are fastened to one rod which extends between the two carburetors and also the two gasoline connections are joined together making the two instruments operate as one.

This motor was a duplicate of the Sturtevant six cyclinder motor installed in the new Burgess Coast Defense Hydro Aeroplane which recently passed the Government trials in such a creditable manner and the makers state that before being delivered to the Government, this motor was subjected to a similar test to the one just described. In the Coast Defense Machine, the engine operates at a speed of about 1400 R. P. M. and as will be seen from the power curve, at this speed it develops over 70 H. P.

The Sturtevant Company attach a great deal of importance to the proper testing of their aeronautical motors and have spared no expense in fitting up a test plate equipped with all necessary instruments for this purpose. They believe that a motor can be given harder use on the test block than it can be expected to receive in an aeroplane. It may be run at longer periods without a stop; at higher speeds than it ever approaches in service; and considerably hotter than it ever approaches in an aeroplane. For this reason, every Sturtevant motor is subject to a long run on the test plate under somewhat the same conditions as just described.

Mr. E. R. Armstrong was very pleased with the result of the test of the motor and immediately accepted it as having fulfilled the requirements in every way The motor was shipped to the Weckler-Armstrong-Lillie Co., of Chicago, where it will be installed in the new Walco Flying Boat which will be flown by Max Lillie in the Great Lakes Flying Boat Cruise.

4 HOUR NON-STOP BRAKE TEST OF
STURTEVANT AERONAUTICAL MOTOR. MODEL D-6 No. 24
FOR WECKLER-ARMSTRONG-LILLIE COMPANY, CHICAGO.
MOTOR DIRECT CONNECTED TO ABSORPTION WATER DYNAMOMETER
LENGTH OF BRAKE ARM 36 INCHES

TIME	R.P.M.	NET WEIGHT ON SCALES	$\frac{2\pi LNP}{33000}$	MECH. LOSS IN DYNAMOMETER	BRAKE HORSE POWER
9.37	MOTOR STARTED				
9.45	1612	89	81.9	1.1	83
10.01	1639	89	83.3	1.1	84.4
10.10	1608	89	81.7	1.1	82.8
10.25	1627	89	82.6	1.1	83.7
10.37	1608	89	81.7	1.1	82.8
10.50	1616	89	82.1	1.1	83.2
11.00	1619	89	82.3	1.1	83.4
11.15	1610	89	81.8	1.1	82.9
11.30	1626	89	82.6	1.1	83.7
11.45	1630	89	82.8	1.1	83.9
12.00	1622	88.5	82.0	1.1	83.1
12.15	1610	88.5	81.3	1.1	82.4
12.30	1609	88.5	81.3	1.1	82.4
12.45	1611	88.5	81.4	1.1	82.5
1.00	1611	88.5	81.4	1.1	82.5
1.15	1607	88.5	81.2	1.1	82.3
1.30	1612	88.5	81.4	1.1	82.5
1.37	MOTOR STOPPED BY SWITCH				
MAXIMUM HORSE POWER TEST					
	1870	83	88.6	1.4	90

REMARKS		
LENGTH OF RUN	4	HRS.
AVERAGE SPEED	1616	R.P.M.
AVERAGE HORSE POWER	83.0	B.H.P.
TEMP. OF WATER AT OUTLET	160°	FAHR.
GASOLENE TEST	64.5°	BAUME
	GALLONS	LBS.
TOTAL GASOLENE USED	31.6	190
TOTAL OIL USED	2.55	19.22
GAS. CONSUMPTION PER H.P. HOUR	.095	.572
OIL CONSUMPTION PER H.P. HOUR	.0076	.058

WITNESSES

E. R. Armstrong
A. A. Merrill M.I.T.
C. H. Mower

APRIL 8, 1913.

B. F. STURTEVANT CO.
HYDE PARK, BOSTON, MASS.

NEWS IN GENERAL

By D. E. BALL

Balloon "Goodyear" Makes Flight

Initial Attempt Successful with Natural Gas Balloon Club Organized at Akron, Ohio.

On May 23, 1913, the balloon "Goodyear," which was built by the Goodyear Tire and Rubber Co., made a very successful flight from Akron, Ohio. This is the same balloon that was entered in the National Elimination flight at Kansas City during the summer of 1912. This is held annually to pick the Gordon-Bennett entries.

Its capacity is 80,000 cubic feet and it measures 54 feet in diameter. Natural gas was used in inflating this balloon, it taking four hours to do so.

The only trouble that arose after inflation was the proper amount of ballast, which was hard to ascertain on account of the experiment of inflating with natural gas. After this, progress was rapid and the balloon rose without a hitch. This was one of the few attempts at flying a balloon inflated with natural gas and proved very successful in every respect.

After rising to a height of 7,000 feet and traveling a distance of 20 miles, the pilot brought the trip to an end and landed safely. There were two occupants besides the pilot.

This first successful flight has instilled a large amount of enthusiasm. The result is the formation among the men of The Goodyear Tire & Rubber Company of a balloon club with intentions of promoting this sport and making numerous and extended flights.

Start of the Goodyear balloon ascension at Akron, Ohio, on May 23. The balloon was piloted by R. H. Upson, who made his first balloon trip with Lieut. Lahm in Paris in 1906 and who piloted the Goodyear balloon in the National Elimination Race at Kansas City last summer.

Accompanying Upson were R. A. D. Preston, aide, and W. T. Morgan. All three of these men are employed in the Aeronautic Department of the Goodyear Tire and Rubber Company. F. A. Seiberling, president of the Goodyear Company, and about 2,000 others watched the balloon go up. A number of the officials of the Goodyear Tire and Rubber Company were there, including H. S. Quine, manager of the Advertising Department; P. W. Litchfield, factory manager, and a number from the experimental department.

Nels J. Nelson's Flying Boat a Success

Nels J. Nelson, of New Britain, Conn., who recently completed his new flying boat, has made several successful tests in the vicinity of New Britain. One of his best flights was made on June 4, with a passenger—Richard Nygrans, of Hardware City, Conn., when he flew from Wethersfield to East Haddam Bridge in 22 minutes. While crossing Middletown, he traveled 2,000 feet in the air. He also flew over Hartford and altogether before returning home, covered a distance of about 65 miles.

Runs Motor on Water and Gasolene

A remarkable discovery recently made by Mr. George McDowell, of Mystic, Conn., the designer and builder of a new type of gasolene motor, was made through a joke passing between Mr. McDowell and an ordinary seaman in regard to a motor test being made by Mr. McDowell. The seaman jocularly stated that the motor would do everything but run with salt water and could not burn salt water, whereupon Mr. McDowell said in a joke he would try and see what he could do in the matter. He took two-thirds of water and one-third of gasolene and ran the motor as long on that test as if he had run it on the same amount or pure gasolene. The reason for this is that the McDowell Motor, which is of novel design, uses two auxiliary pistons to each cylinder which draw in and mix the charge and then force it into the manifold under compression. In this manner Mr. McDowell has been enabled to bre up a charge of gas and water in such a way the the water entering into the cylinders and being fired by the gas is generated into steam and works the engine as a combined gasolene and steam engine.

At first it was noticeable that the salt water had a tendency to corrode the cylinders, but Mr. McDowell obviated this by putting oil in the same tank with the gasolene and water. The peculiar method adopted by Mr. McDowell to mix the three ingredients is to use a belt-driven mixing fan placed in the round shaped tank which thoroughly mixes up the charge before it is admitted into the cylinder. This mixing of the gasolene and water in this manner is what makes it possible for this engine to run on water and gasolene, for it will be seen that the particles of gasolene entering the cylinder surrounded and mixed with particles of water in exploding heat these and turn them into steam, thus the piston receives a power impulse from the expansive explosion of the gas and the expansion of the steam. Of course the motor is started on pure gasolene. In starting the motor it is run for a short time on pure gasolene until warm, after which the water and gasolene mixture is turned on and the motor continues to run regularly and with more power on this mixture.

Some Good Wind Flying Seen at the Aeronautical Society's Meet

The Flying Carnival held by the Aeronautical Society of New York at their grounds at Staten Island, N. Y., on May 30, 31 and June 1, proved highly interesting although it was somewhat hindered by the high winds and minor accidents. The average attendance each day was about four thousand.

On the opening day, May 30, there was about a twenty mile wind blowing which somewhat hampered proceedings as several of the machines were new ones and some of the pilots had not been flying since last year. In the early part of the day Cecil Peoli flew the redesigned and reconstructed Baldwin biplane over from Captain Baldwin's grounds. He had been having a little difficulty in getting the machine tuned up right as it was found in reconstructing and fitting a new tail and elevator to the machine that it threw it badly out of balance, in fact so much so that in the first tryout a couple of days before the meet Peoli very nearly had a serious accident, which was only avoided by his keeping a cool head.

Nevertheless, he soon found out what the trouble was which turned out to be the new tail lifting too much and the rudders having too much of a balanced portion in front of the pivot which made it impossible to control the machine and caused it to dash from side to side.

Harry Bingham Brown officially opened the meet by flying from Grant City to Oakwood Heights with Miss Rosalie Jones, the well-known champion of woman's rights, who flew with him to the grounds where she addressed the audience. In the meantime Peoli ascended on the 80 H. P. Hall-Scott Baldwin which he had now got in better shape and made a beautiful exhibition flight in a strong wind at a good altitude. While Brown was getting his Wright machine ready to take Arthur Lapham up for a parachute jump, Peoli went out again to amuse the crowd, making one of his rapid climbs and encircling the field several times. He was followed by Brown and Lapham ascending in the Wright biplane for an exhibition of parachute jumping from an aeroplane. Brown was to ascend to a considerable height and then Lapham jump from the machine with the Stevens' safety parachute as he had previously done on several occasions. Owing to a faulty engine Brown was unable to make the machine climb, however, and when over the far part of the field, at a height of not more than 500 feet, the machine was caught in a bad down current and fearing lest the machine would fall into the swamps, and believing he could make the drop from this low altitude and relieve the machine of his extra weight, Lapham decided to try it and climbing from his seat jumped from the machine just as it was forced still lower by the missing engine and severe down currents. The result was that when Lapham left the machine it was at an altitude of not more than 300 feet and he plunged straight down with the parachute streaming behind him but not opening until just as he touched. He was too near the ground, however, for it to check his fall and he plunged into the soft mud right up to his armpits, it taking over twenty minutes to dig him out of the mire. Upon examination he was found to have no bones broken but was suffering from severe sprains from the shock and was removed to the hospital. Brown, realizing that Lapham had jumped when the machine was too near the ground, made all haste to get down and ascertain whether Lapham had made the drop safely. He dove his biplane down into the field in a rather careless fashion, breaking the skids which put him out of the running for the day, leaving only Peoli in the Baldwin and Walter Johnson in the new Thomas to go up. When the excitement of Lapham's fall had somewhat subsided, Peoli, who had been one of the first to reach him, ascended again to reassure the crowd. He was followed shortly afterwards by Walter Johnson in the Thomas, who had been having trouble all afternoon with a faulty motor. Johnson only made a short flight owing to the way his engine was running, but the machine when in the air showed itself to be very speedy and steady. It seemed somewhat unsteady when running on the ground, for the weight seemed to be placed too far forward and the wheels a little too far back. This was further emphasized when later on in running across the field at a low speed the machine rolled over on its nose, fortunately without doing any damage either to itself or the pilot.

The day's performance ended up by another exhibition flight by Cecil Peoli and the arrival from Hempstead, L. I., of C. M. Wood on a 50 H. P. Moisant monoplane. In spite of the strong contrary wind which blew all the afternoon, Wood set out on this flight and the fact that it took him 1 hr. 31 mins. to accomplish the distance of 30 miles between Hempstead and Oakwood Heights shows the strength of the wind he was fighting against, the excellent qualities and air-worthiness of the Moisant monoplane and the skill of the pilot who, by this and other performances, has distinguished himself as one of our leading monoplane pilots.

On May 31, the second day, the wind was a little bit stronger than on the previous day, but in spite of this fact, Cecil Peoli was again out handling the wind in fine shape on his Baldwin until he was compelled to put a stop to his flying by engine trouble when at a height of about 1,200 feet and just as he was out over the edge of the water. In pursuance of his usual plan when in difficulty, he made a very steep glide into the nearest clear patch of ground, plunging straight down from this height in a few seconds and straightening up when quite near the ground. While Peoli was up battling with the wind and just before his trouble, Wood, in spite of the very strong wind, brought out his Moisant monoplane and made a flight which could not but have impressed all who witnessed it. He was struck by every manner of gust, but kept right on and flew not one large circle of the field, but several, finishing up with a thrilling glide over the top of the hangars where he was struck by gusts which threw him from side to side in a most alarming manner. He, however, made a perfect landing.

Later on, the wind having died down somewhat, Brown ascended in the Wright with Lieut. Riley Scott, the winner of the Michelin bomb dropping contest, who was to give an exhibition of scientific bomb dropping from Brown's machine, but as on the day before, the biplane refused to lift well and they were compelled to land at the far end of the field. In the meantime Walter Johnson ascended on the Thomas and arising to a good height made several circuits. While he was still in the air Wood went up on the Moisant and shortly afterwards Brown was seen flying the

The above pictures show Arthur Lapham making a parachute jump from an aeroplane with one of Leo Stevens' new "pack" devices. In the first picture, Lapham is about to make the leap from a Wright biplane piloted by Harry Bingham Brown; in the second picture he has just left the plane and in the third picture he has shot down considerably below the plane, and his "pack" having successfully opened by the pulling of a cord, he can be seen dangling in the air and gradually and safely descending to the ground below.

Wright back alone. Wood and Johnson landed first and Brown attempted to glide into the field by the side of the hangars but misjudging his height and the strength of the wind, only just succeeded in reaching the field and was unable to entirely clear the inner fence, one tip of his wing just touching and slewing the machine around and smashing the skids and wing end.

On Sunday, June 1, the last day, the wind was still stronger and with the 80 H. P. Baldwin crippled and the Wright damaged it did not look as if there would be much doing, but nevertheless after working all night the Wright machine was got into shape and made a flight during the day but was again damaged in landing. As there was not much doing Peoli was induced to take out the old 60 H. P. Hall-Scott Baldwin and in spite of its poor condition he made two creditable flights on it. Walter Johnson on the Thomas, and C. M. Wood on the Moisant, also made splendid flights later in the day, so that taking things all in all and considering the poor weather conditions, the Aeronautical Society's first meet while not a howling success nevertheless demonstrated the fact that in spite of winds and poor conditions it is now possible for good aviators to fly in almost any weather and if at future meets they have a few more aviators on hand there is no reason why more good flying should not be accomplished and more interest aroused.

Jannus in Benoist Flies 250 Miles

On May 24, Anthony Jannus in the Benoist hydro-aeroplane, made a flight from Paducah, Ky., to St. Louis, Mo., a distance of 250 miles. Upon reaching St. Louis, he had only half a pint of gasolene left and was compelled to land at the foot of Cherokee street, nearly three miles south of his intended landing place, the foot of Market street.

According to his log, Jannus left Paducah at 11 o'clock in the morning accompanied by a mechanician, and made the trip in four hours and thirteen minutes' actual flying time. When opposite St. Genevieve, Mo., he glided down to the water and refilled his gasolene tanks.

Four Hydraeros Fly from Annapolis to Chestertown and Return

On June 3, four hydraeros (hydro-aeroplanes and flying boats) each having two occupants, were flown by naval aviators from Annapolis to Chestertown and return. The distance of fifty-nine miles was covered in one hour and ten minutes in a cross breeze of 18 miles an hour. The machines maintained an average altitude of 2,400 feet and upon their return to Annapolis they circled over the bay and river in view of the members of the Board of Visitors and others who were watching the drill on the academy parade grounds.

The hydraeros which made the trip with their occupants were: The Curtiss hydro-aeroplane A-2, Lieut. B. L. Smith, Marine Corps, pilot, and Mechanician Daniels; the Curtiss hydro-aeroplane A-3, jointly controlled by Ensigns G. de C. Chevalier and Billingsley; A Wright biplane, Lieut. A. A. Cunningham, pilot, and Mechanician Green, and a Curtiss flying boat, jointly controlled by Lieuts. John H. Towers and T. N. L. Bellinger.

Atwood Tests Flying Boat

On May 31, Harry N. Atwood in his Curtiss motored flying boat, left Sandusky, O., on an intended trip to Cleveland, but was compelled to give up through wind and fog and running out of fuel when off Bar Point near Amherstburgh, Ont. He drifted around for some considerable time before he was rescued but the machine was not damaged in the least.

On June 10, in attempting to fly from Ecorse, Mich., back to Sandusky, Atwood again was compelled to alight on the Lake and take shelter at an island for some time before continuing his trip with the result that he did not get in to Sandusky, O., until after one in the morning, his long delay causing considerable alarm.

Christofferson Flying Boat Proves a Success

On May 30, at San Francisco, Silas Christofferson successfully tried out his flying boat which has been purchased by Capt. Roald Amundsen, who will take it with him on his next polar expedition. The machine is equally at home either in the air, water, or on the ice, and it is thought that it will prove of value for polar exploration work. In the trials the new Christofferson boat rose from the water after a remarkably short run and even surprised Mr. Christofferson by the ease with which it flew.

Earl V. Fritts in Thomas Machine Flying Well

Earl V. Fritts, of Oneonta, N. Y., who has been doing some excellent flying recently in his Maximotored Thomas, has entered the exhibition field and on May 30 at Rensselaer Park, Troy, N. Y., he made two flights of over ten minutes' duration, greatly pleasing the audience.

The above picture shows the five concrete and steel hangars occupied by the Moisant Company's School of Aviation at Hempstead Plains Field. As can be noticed, the centre hangar has been made into a lounging room for the students of the school and others who may wish to secure refreshments. The chief pilot of this school is S. S. Jerwan and up to the present time he has developed a great many well known aviators.

Hempstead Plains

Things were pretty lively at the Hempstead Field during the past month, and what with the arrival of new machines for the different schools and the increased activities going on amongst those already there, it looks as if the field will be busier this summer than ever before.

DOUGLAS HOUGHTON.

Douglas Houghton, general manage rof the Hempstead Plains Aviation Field, is one of the most active men in the aeronautical movement and it is to a large extent through his able management that this field has been so successful up to the present time.

MOISANT.

The Moisant School has now got in fine running shape, there being no less than six machines available for school use, four fitted with Anzani motors and two with Gnômes. Instructors S. S. Jerwan and C. Murvin Wood have been busy training the pupils already on hand. George F. Puflea, of Chicago, and William McGinn, of Cincinnati, are two pupils about ready to try for their license; William A. George and Dante Nanini are making straight flights, while the two other pupils, S. Gordon, of Staten Island, and John McCue, of New York, are grass cutting and making short hops.

In addition to the training of the pupils there has been considerable flying accomplished at the camp, Harold Kantner having been busy testing the two-seater monoplane for the Guatemala government, as well as making exhibition flights on some of the school machines and a flat-winged racing type. C. Murvin Wood, who distinguished himself so creditably by flying from the field to Oakwood Heights on Decoration Day, and who made a magnificent return trip on the day after the Oakwood Heights meet, has not been content to rest on these accomplishments, but instead has been flying at every opportunity since his return.

The new luxurious clubhouse is finding considerable favor with the students and visitors and is proving quite an attraction.

HILD, MARCHONET AND BRAUNINGER.

Hangar No. 6 is occupied by Frederick C. Hild and his partner, Marchonet, who are sharing it with Frederick H. Brauninger. Hild now has several pupils on hand, one of whom, Alto L. Barnes, of Dothan, Ala., has proved himself an apt pupil and is already making straight flights and half turns. Hild continues to make demonstration flights on the school machine, while the new passenger-carrying monoplane is being pushed to completion.

Brauninger is fitting his Blériot type with an 8-cylinder V type air-cooled Curtiss motor, and expects to be in good working order shortly.

SPAINOUR.

In hangar No. 7 James S. Spainour is rushing work on his novel monoplane, which has been fitted with a 60 H. P. Boland motor, and he hopes to have it out by the time this appears in print. It is being fitted with a Wright type control, as it is to be flown this summer by C. B. Prodger, a Wright pilot, who will use it in exhibition work in North Dakota and Montana. The trials of this machine in its new form should prove highly interesting, especially in view of the fact that it flew so well before when fitted with only a 25 h. p. motor.

HAMILTON.

In Hangar No. 8 George Hamilton is busy erecting a new monoplane and repairing others that are damaged. Mr. Hamilton has recovered from his recent fall at the field and expects to be flying again shortly. Hamilton's fall was caused by the collapse of the fuselage on each side where the rear warping wing spars attach. As there was no big compression spar at this point, the strain on the wings caused the fuselage to buckle in and the wings gave way. This accident has taught its lesson and we find most of the monoplane flyers on the field putting in a compression struts across the fuselage between the rear warping spars.

BECKWITH AND CRABTREE.

In hangar No. 9, there is to be found Sydney F. Beckwith's large Maximotored military type tractor biplane which is being experimented with by both Mr. Beckwith and his aide, Mr. Crabtree. Short flights are being made on this machine by both Mr. Beckwith and by Mr. Crabtree.

MALDONADO AND GARCIA.

Hangar No. 10 is occupied by Maldonado and company, Zolio H. Garcia, San Domingo government machine.

SCHNEIDER AND RICHTER.

Hangar No. 16 is occupied by F. P. Schneider, who has a 70 H. P. Schneider biplane on the field, which is being flown by Joseph Richter, who has made some excellent flights with it at a considerable altitude.

BOLAND.

Hangar No. 17 is occupied by the Boland Aeroplane and Motor Company, who have a double control school Boland tailless biplane there now and a new machine just arriving. Horace Kemmerle, the Boland instructor, has been making a number of flights daily and is busy teaching the pupils on hand and making passenger flights. Fausto Roderigues and Jesse Waters are the two most advanced students. The Boland machine flies beautifully and seems to take care of itself under ordinary conditions.

SLOANE.

Hangars 18 and 19 are occupied by the Sloane Aeroplane Company, who are now established at the field and have opened their school. The instructors are William B. Atwater, Guy Gilpatric and Charles Baysdorfer. The school's equipment of machines consists of two single-seater Deperdussins, one two-seater Deperdussin, two Caudron monoplanes, and one Curtiss type biplane. The students already enrolled are Miss Stahl, Messrs. T. Steptoe, W. Haskins, T. Kanaya, LeRoy Allen, Roberts, Peabody, W. Lanke, Carl Kubl, Hans Weideman, James H. Clarke, Mattoon, Ill.; P. V. Martini, N. Y.; P. W. Dunn, New Brunswick, N. J., and Alfred W. Lawson. All the machines have been thoroughly overhauled and got in fine shape, so that there will be no delay in conducting the school work caused by poorly adjusted or badly tuned up machines.

Mr. Baysdorfer's passenger-carrying Curtiss type has been thoroughly overhauled and the planes coated so that they now have a glass-like finish. In addition to passenger-carrying work, this machine will be used for demonstration and exhibition flying, it being intended to use chiefly monoplanes in the school work.

DYOTT.

Hangar 20 is occupied by George M. Dyott, who has the neat little monoplane shown in an accompanying illustration on the field where he has been doing some splendid flying with it during the past month. Mr. Dyott is placing the Dyott monoplane on the market and will shortly have out some larger machines of the new type, one or more of which will be two-seaters. In addition, he has just purchased the Aero Club of America's two-seater, Nieuport, and is thoroughly overhauling it in his hangar.

SCHMITT.

Hangar 21 is occupied by Maximillian Schmitt, who has a 50 H. P. Blériot type monoplane built by Harold Kantner, while, in addition, he is building a monoplane of his own design.

PEEKSKILL CO.

Hangar 22 is occupied by the Peekskill Hydro-aeroplane Company, who have a monoplane with a new type of control.

HARRIMAN.

Hangar 24 is occupied by F. H. Harriman with a Harriman biplane.

McLAUGHLIN.

Hangar 26 is occupied by Peter McLaughlin, who has the McLaughlin tractor biplane, which was formerly flown for him by Henri St. Ives, and is now being overhauled.

BELLANCA CO.

Hangar 27 is occupied by the Bellanca Aeroplane Company, who have a neat machine stored there and which is now undergoing trials.

U. S. A. N. CO.

Hangar 28 is occupied by the U. S. Aerial Navigation Company of Homestead, N. J., with Schmitt as aviator.

HEINRICH BROTHERS.

Hangar 30 is occupied by the Heinrich Brothers. They have opened their school at the field and have already enrolled two pupils. Albert Heinrich has been flying back and forth between his home at Baldwin, L. I., and the Hempstead Plains school lately in a manner which indicates that cross-country flying for him is a real pleasure.

The Curtiss Camp

By Lyman Seely.

Curtiss activities during the past month have been even greater than before and what with the large number of pupils being trained and the number of flying boats and hydro-aeroplanes being turned out and the number of orders for land machines and motors coming in, things have been very active at the Hammondsport plant.

The new tractor propeller four passenger flying boat built for Harold McCormick has been given its trials and proved very successful, and has been delivered to Mr. Harold F. McCormick, at Chicago.

Among those who rode with Mr. Curtiss on the trials of the McCormick flying boat were L. A. Vilas, of Chicago; Charles Niles, of Rochester; Marshall Reid, of Philadelphia. There were half a dozen water-flying machines on Lake Keuka during the trials and a number of brushes resulted. R. V. Morris of New Haven had out his fast little 26 ft. hydro-aeroplane with 80 H. P. motor; Marshall Reid had his new flying boat; Beckwith Havens was in another flying boat; Lansing Callan had a standard Curtiss hydro-aeroplane, and W. Van Vleet, another standard machine.

Three or four more flying boats, including those of Mr. Vilas, J. D. R. Verplanck, G. L. Heckscher, will shortly be added to the fleet, and within a couple of weeks there should be more water-flying machines, privately owned, than participated in the recent international races at Monaco. And these will be true flying boats, and not mere racing aeroplanes with the lightest possible pontoons.

The actual mileage that is being piled up during the regular training of pupils at the Curtiss Camp reflects great credit on the consistent work of Instructors J. Lansing Callan and Francis Wildman. During three days of instruction work Callan flew more than 1,000 miles and it is seldom that he flies less than 250 miles in a day and on several occasions this Spring he has passed the 400 miles mark. Wildman does almost as much but his recent trip to Europe upset his mileage total by a break of three weeks.

Some good missionary work has been going on at the Camp and many distinguished visitors are brought to Hammondsport and given their first experience in the joys of flying air water craft and all have enthusiastically declared themselves as charmed with the experience and many have announced their intention of taking up the new sport. Recently the members of the New York State Commission for the Perry Centennial celebration at Buffalo paid the Camp a visit and were shown the contrast between marine navigation in Perry's time and the present. On another oc-

casion Mr. Curtiss carried Senators John F. Malone and Wm. L. Ormrod and Assemblyman S. L. Adler in the flying boats for a total of about 40 miles, to the apparent delight of the legislators. They can now see something in flying beyond the merely spectacular.

Irwin Chase, designer of the Elco Speed boats, also spent some time observing tests on a pair of the new O-X motors. They held up 96 H. P. until he tired of watching them and then he turned his attention to the flying boats.

After watching the big surfaced "school" boat for a time he decided out loud that he could give it an awful beating with a real 40-mile an hour motor boat. Along later in the day Wildman and Bert King had out the Heckscher flying boat and invited Chase for a ride. Now the Heckscher boat, with the new 100 H. P. motor, is much faster than the school boat, and it wasn't at all difficult to convince the naval architect that his eyesight deceived him. He came ashore willing to admit that the Flying Boat is the only speed proposition in the boat line. Chase allowed the Heckscher boat better than sixty miles an hour on the water, which is ten miles faster than any motor boat ever traveled on the water.

More than fifty members of the Rochester Chamber of Commerce also visited the flying camp, and were much impressed with the performance of the water fliers.

An instructive feature of interest at the Camp is the bi-weekly meetings of aviators and students at which there are talks and discussions on different phases of the flying question and lectures and addresses by eminent authorities on aviation. At a recent meeting Dr. A. F. Zahm, scientist and aeronautical engineer, spoke to the students on the future of aviation and at another meeting a debate was held on the topic, "The Biplane is More Efficient than the Monoplane." The sides were headed by Raymond V. Morris, of New Haven, affirmative; Marshall E. Reid, of Philadelphia, negative. Points considered were, structural advantages, speed, weight-carrying ability, climbing and gliding, stability. Reid, who is well known as a biplane flier and who really wouldn't drive a monoplane on a bet, worked for the monoplane as though his business depended on securing recognition for the advantages of that type of machine. He was ably seconded by Beckwith Havens, another biplane flier, and Van Vleet, who is experienced with both types. Morris, J. Lansing Callan and the other affirmatives were able, however, to present their side of the case in such fashion that they won out, though only by a narrow margin. The relative advantages of tractor machines versus propeller driven machines will also be debated at the next meeting. As both styles are now in daily use at the Curtiss Training Camp the debaters will have first hand information to work on.

Cicero

The bad weather during the month of May and first part of June, and the absence of Jimmy Ward and his fliers somewhat dampened the activities. The Lillie School is as active as always, but outside of Thompson and Lillie, there is not much flying done on Cicero Field. W. C. Robinson takes a spin in his new Neuport occasionally but as he learned to fly in the Lillie School with a Wright control and now is using the Nieuport control, he has to take it easy and pick out good weather for his practice.

On Saturday morning, the last day of May, a young aviator, Jim Colovan, was killed right outside the Cicero Field. He had instructions not to get off the ground, but he was the owner of his own machine and thought more of his ability than really was there, so he would not listen to the older men's advice. The result was that he hit the tree tops on his way down from an altitude of 350 feet, turned his machine over, fell and was crushed under the heavy engine.

Pennsylvania News

By W. H. Sheahan.

The first balloon ascension of the season was made on May 3rd by Clarence P. Wynne, president of the Aero Club of Pennsylvania and Arthur P. Atherholt and Harold Knerr. The start was made from the Club grounds at Holmesburg and a landing made about six miles east of May's Landing, N. J.

A second ascension by members of the Penna. Aero Club was made on May 17 with Arthur T. Atherholt acting as pilot and A. W. McClellan as passenger. The Holmesburg field was left about noon, while it was raining torrents. The balloon Pennsylvania II. soon rose above the clouds, attaining a height of 1,500 feet and when the landing was made in Lebanon the aeronauts reported that the trip had been a fairly "dry" one.

The Philadelphia Aeronautical Recreation Society opened their ballooning season on May 13 with an ascension from the United Gas Company's grounds. Dr. Thos. Eldredge, vice-president of the society, acted as pilot, with Lee McClure, Lloyd Barnett and Charlton Eldredge as passengers.

Leicester B. Holland, of Philadelphia, has returned from Paris with a pilot's license from the Savary School where he completed his course under Frangeois, who but a short time ago broke a world's record for altitude with seven passengers.

Marshall Earl Reid, the Philadelphia aviator, whose Curtiss flying boat was on exhibition at the Bellevue-Stratford Hotel for a week, has removed same to League Island Navy Yard and has made several successful flights with passengers.

To have members of the Aero Club of Pennsylvania enlist in the National Guard of Pennsylvania with the idea of establishing an aviation corps in the State military body was the proposition acted upon at a meeting of members of the club, held at 1317 Spruce street, Philadelphia.

The proposal to establish an aviation corps in the guard will in all probability be submitted to the military authorities at an early date. C. P. Wynne, president of the Aero Club, in discussing the matter, declared that the plan as formulated by the members would make the aviation corps part of the signal corps. He stated that by having the members of the club enlist they would be able with their knowledge of the importance of aviation to demonstrate its value to military maneuvers and thereby create sufficient interest to cause the State to establish a corps.

Burgess Activities

Lieutenant Murray completed his training with Mr. Coffyn recently and is now prepared to operate alone.

The Flying Boat for Mr. Collier is well under way in the Burgess shops and it is expected that it will be completed the latter part of this month. It will be powered with a 200 H. P. Anzani especially imported for the purpose.

The new Signal Corps aeroplane ordered under the 1913 specifications is well under way. This will be the largest aeroplane ever built in the Burgess factory.

Atwater Has Joined Sloane

Mr. William B. Atwater, the aviator of Central Valley, N. Y., who married the widow of the late Senator Platt about two years ago, has become associated with John E. Sloane, of the Sloane Aeroplane Company, in the manufacture of aeroplanes and hydro-aeroplanes.

Mr. Atwater first took up flying in 1911 in California. He and Mrs. Atwater were greatly interested in the sport and he was the first sportsman to buy a hydro-aeroplane.

After obtaining his license, No. 98, he and Mrs. Atwater made a great number of flights together in California, and he participated in the Los Angeles Meet of 1911. Shortly after that they decided to make a trip around the world and to take their hydro-aeroplanes with them. He made his first flight as a demonstration for the Imperial Japanese Government on May 11th of that year at Yokohama. Among those present were the Emperor and his son, the Ambassadors from Russia, France, America and Great Britain, Admiral Sito, Admiral Togo and many more leading officials of the Japanese Government.

The first flight was a demonstration over the city lasting about thirty minutes. The second flight was with Capt. Yumakiete as a passenger, and they passed over the Japanese fleet which was anchored in the harbor. On this flight an altitude of 2,000 feet was reached. The third flight required in the demonstration was to deliver a message from Admiral Sito to one of the torpedo boats in the fleet and bring back a reply. This was accomplished successfully, and as a result of this first demonstration of the hydro-aeroplane in Japan the Imperial Government purchased three machines from Mr. Atwater and sent three officers to the United States to learn how to fly.

A short time after that Mr. Atwater had the privilege of being the first aerial mail carrier in Japan. He delivered a bag of mail, for which special stamps were issued by the Government, from Tokio to Yokohama, and returned with another package.

Up to the time of Mr. Atwater's arrival in Japan

Mr. George M. Dyott and his new 50 H. P. Dyott monoplane with which he has been making some splendid flights at the Hempstead Plains Aviation Field. As will be noticed the machine is quite small and is of the most improved design and construction. It is very fast and a remarkable climber.

the only records for aeroplanes for that country were an altitude record of about 600 feet and a duration record of about ten minutes. During his stay there Mr. Atwater made an entirely new set of altitude, duration, speed and passenger-carrying records for Japan. As a result of his flights, his license issued by the International Aeronautic Federation, of which Japan is not a member, was vised by the Japanese Government, thus making him the first aviator to have a license recognized by the Japanese Government.

At Osaka Mr. Atwater made a special flight for Prince Kuni, brother of the Emperor, and Mr. Atwater was decorated for this flight with the "Order of Rising Sun." He received the insignia of this order from the hands of Prince Kuni. Prince Kuni also presented him with an encrusted cigarette case bearing the imperial crest, which is never used without permission of the Emperor.

His farewell flight in Japan was made over Mississippi Bay, the place where Admiral Perry landed on his mission to open the ports of Japan to the commerce of the world.

From there Mr. Atwater sailed for China, where he flew for the representatives of the new republic, also at a meet organized by the Chamber of Commerce at Shanghai.

From China Mr. Atwater went to the Strait Settlements, where he flew for a special committee of the consular and military officials at Seaview. This flight was witnessed by the Sultan of Jahore, who since then has become very enthusiastic over flying.

On his way to Europe Mr. Atwater stopped at Manila and made a number of flights there at the polo field. He returned to America by way of Europe, having been away from New York about a year and a half.

A feature which was of great interest to the orientals was the fact that Mrs. Atwater so often accompanied her husband on his flights.

Mr. Atwater will have charge of the demonstrating, school and exhibition work for the Sloane Aeroplane Company, and will conduct their machines in all the big competitions in this country and abroad.

Mr. Atwater served in the Navy during the Spanish-American War, and became a non-commissioned officer.

The Wright Company No Longer Charges Royalty for Exhibition Flying With Their Machines

It does not seem to be generally known that The Wright Company no longer charges royalty for the use of their machines for exhibition flying. As a matter of fact no flying royalties have been charged since January 1st, 1913. While the Wright flyers have always enjoyed a considerable advantage over other types of machines in obtaining exhibition contracts, on account of the superiority of the machine, the Wright Company has decided, because of the greater competition in the exhibition business this year, to give their patrons still greater advantage by discontinuing the royalty charge for exhibition work. This means that the purchaser of a Wright machine will have the free and unrestricted use of the machine, and does away with the making of bothersome monthly reports to the Company as heretofore.

Marshall E. Reid Flying His Flying Boat in Philadelphia

Marshall E. Reid, the former Wright pilot, who recently purchased a Curtiss flying boat, has taken it to Philadelphia, his home town, where, after exhibiting it at the Bellevue Stratford Hotel, he took it to the League Island Navy Yard, and has been making a number of passenger flights. He contemplates starting shortly a regular flying boat passenger service at Panama.

New Altitude Record in Navy

Altitude records for Curtiss hydro-aeroplanes, and in fact all types of flyers in the navy, were surpassed on June 13th at Annapolis, when Lieut. Bellinger, of the flying corps at the Naval Academy, attained a height of 6,200 feet in forty-four minutes. The best previous record, of 4,450 feet, was made last summer by Ensign Herbster.

Lieut. Bellinger started from the hangars soon after one o'clock, and from the time he left the surface of the water he climbed steadily for 44 minutes. Within 49½ minutes after the start he was down and his machine was being put away for the day.

Injunctions Restraining Airmen From Flying

On June 10th, during the International Polo Match at Meadow Brook, which lies adjacent to the Hempstead Plains Aviation Field, Frederick C. Hild and C. Murvin Wood flew over the polo grounds just prior to and while the game was in progress. Hild repeated the flights over the polo grounds so often and at such a low altitude that the officials of the meet as well as the spectators became much wrought up over the nuisance as they called it, which resulted in the Polo Club officials getting out an injunction against all of the aviators and school pupils of the Hempstead Plains Field from flying over the polo grounds while games were in progress in the future. The Aero Club of America also suspended Hild's license until the first day of January, 1914, and Wood's license until August 1st, 1913, although it is claimed that Wood did not fly over the field while the game was in progress but prior to it. AIRCRAFT sincerely hopes that such offences as disturbing public gatherings so flagrantly will not be undertaken by aviators in any part of the United States in the future, for it is likely to so enrage the prejudiced public against flying that not only may strict injunctions be gotten out by cranks generally who are opposed to aviation, but some crank Assemblyman or Congressman may feel that it is his mission to put through a bill prohibiting flying anywhere outside aerodromes, and as the majority of Assemblymen and Congressmen know nothing about aeronautics and care less about it, a bill detrimental to the interests of aeronautical progress would be a very easy bill to have passed into a law, so we warn all aviators not to play with the fire and bring unnecessary hardships upon those who are trying to develop the movement generally.

Notice

"Law in Massachusetts," as mentioned in our editorial, was unavoidably crowded out of this issue but will be published in full in the August AIRCRAFT. Also a splendid article written for AIRCRAFT by Robert G. Fowler relating to his recent trip across the Isthmus of Panama and an excellent article on Stability in Flying Machines by Albert Adams Merrill.

Special Notice

As AIRCRAFT is compiling a list of all the different makes of aeroplanes throughout the world for publication, we will sincerely thank all builders to send us full details and specifications of their machines (either completed or in course of construction) *immediately*. We will also thank any reader of AIRCRAFT to give us the names and addresses and information concerning aeroplanes or dirigibles now being built in this vicinity.

Fake Story Circulated

The fake story published in both the daily and weekly newspapers generally on June 12, purporting that the propeller of Lieut. A. A. Cunningham was pierced by a rifle shot while the machine was in course of an air journey recently, was repudiated in a letter from Lieut. Towers, U. S. N., to AIRCRAFT.

This is one more instance showing the necessity of reading AIRCRAFT to be sure of the facts instead of gulping down the fancies of the dailies and weeklies.

Resolution Endorsing National Air Craft Registration and Operator Licensing Bill

At the general meeting of the members of the Aeronautical Society, held May 8th, 1913, on motion duly made, seconded and carried, the following resolution was unanimously passed:

WHEREAS, It is deemed to be for the best interests of the American public that a proper official record be kept of all aeronautical craft operating in the United States and its possessions, and that such craft be subjected to proper restrictions and registration for the purpose of safeguarding life and property; and

WHEREAS, It is desirable that all such air craft and their operators be regularly and properly examined as to safety and competence; and

WHEREAS, It is thought that the passage of bills in the Legislatures of the several States would interfere with and hinder proper regulation and control of the matters aforesaid; and

WHEREAS, There is now a bill before Congress introduced by Senator Penrose, of Pennsylvania, providing for the above among other things, all of which it is deemed by this society is for the best interests of aeronautical science and industry and the public generally; therefore, be it

Resolved, That this society place itself on record in favor of the aforesaid bill; and be it further

Resolved, That copies of this resolution be printed and mailed to the various members of Congress, and that the same be printed in the next issue of the society's Bulletin.

On May 8th the public press announced a similar bill introduced in the French Federal legislative bodies.

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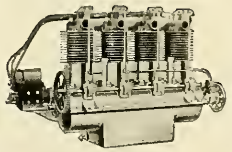

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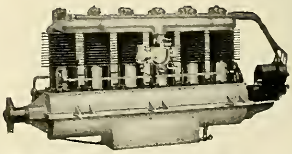

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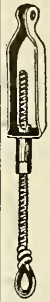

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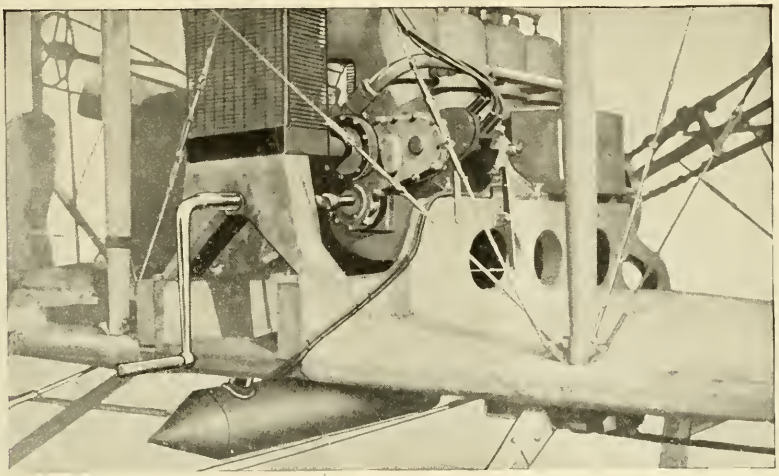

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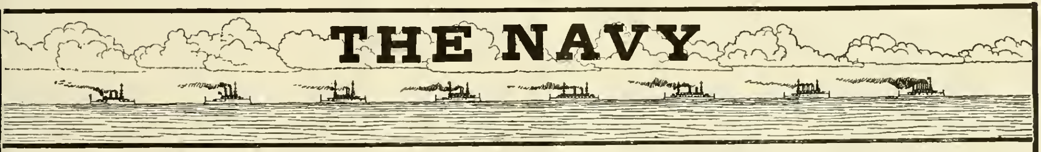

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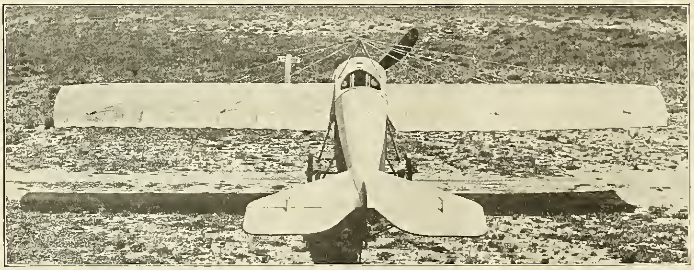

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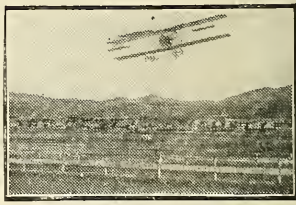

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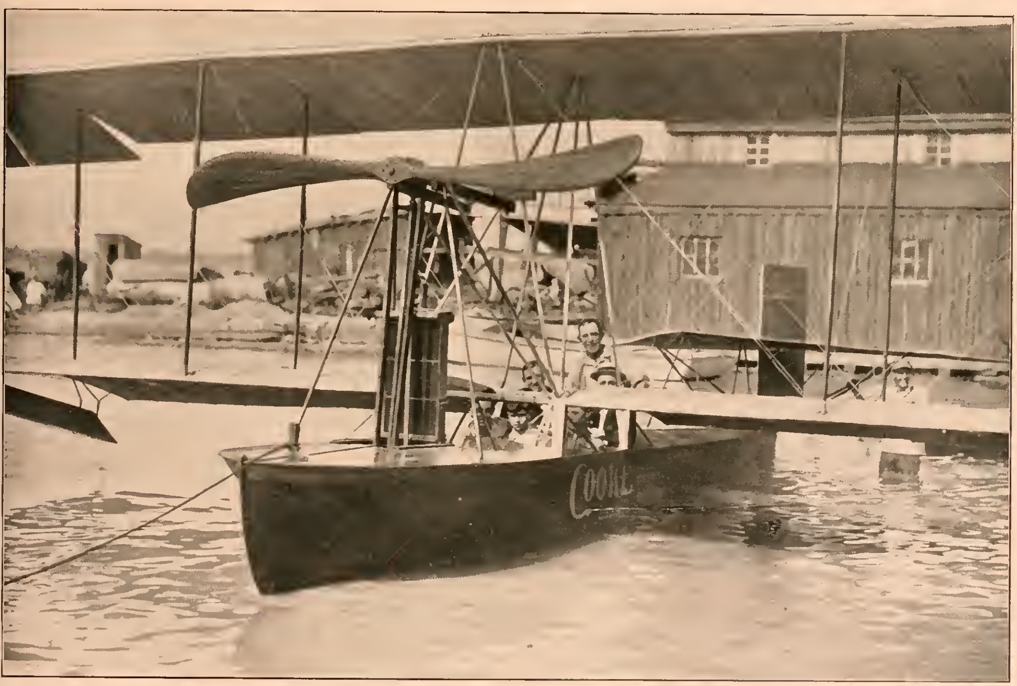

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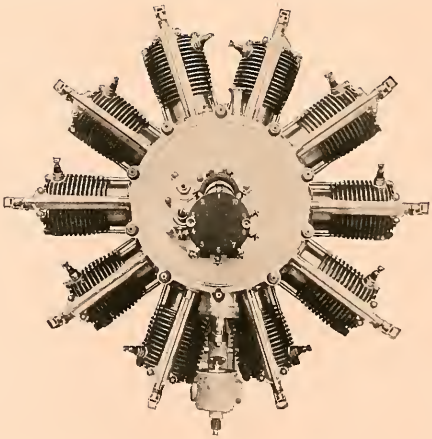

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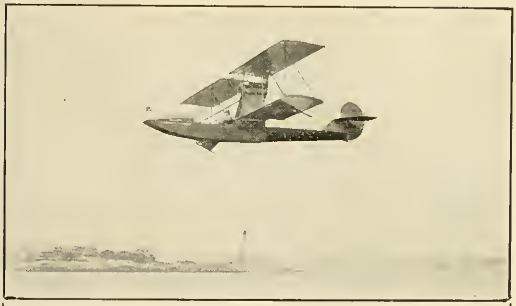

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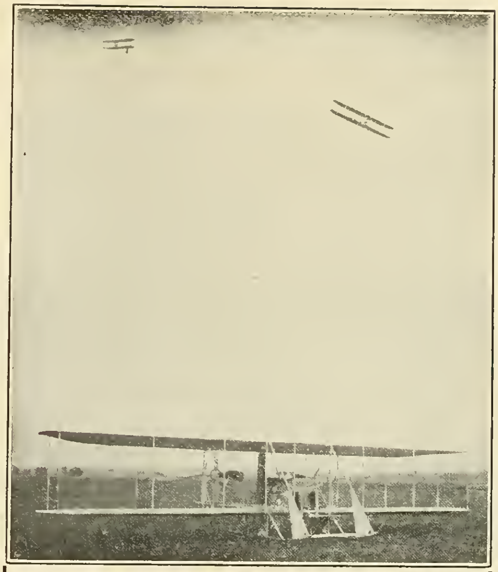

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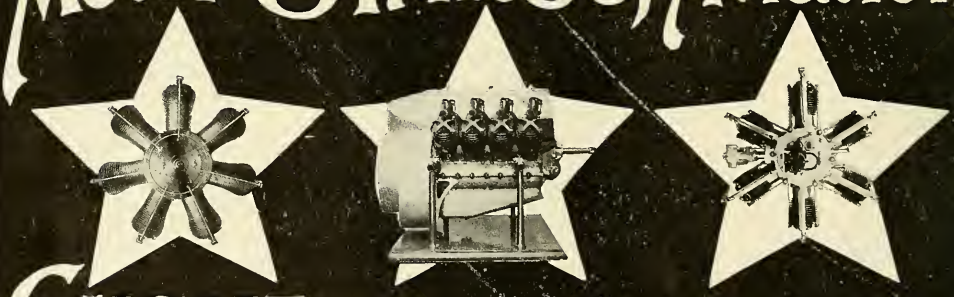

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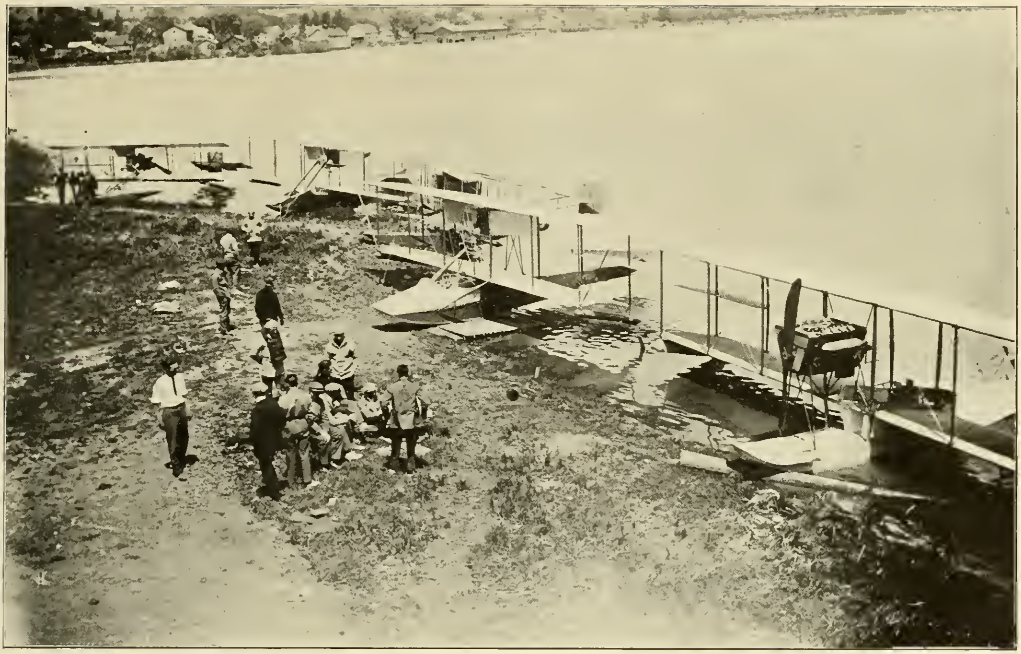

Several Curtiss flying boats and hydro-aeroplanes lined up on the beach of Keuka Lake. This picture is perhaps the best evidence to produce to show the reader how rapidly over-water flying is developing in this country, and also to demonstrate the fact that the Curtiss Company is turning out these air-boats in great numbers. As AIRCRAFT has mentioned before, it will not be long before every lake, river and bay throughout the United States, or in fact the whole world for that matter, will present just such a scene as is depicted in this photograph, only perhaps on a much larger scale.

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In a lecture given to the Aeronautical Society of Great Britain recently, Major F. H. Sykes, of the Royal Flying Corps, said that aviation will not revolutionize warfare, but that, of course, it will have a great effect upon it. That is to say, the fog of war, the "hill" behind which Wellington used to say he could not see, will to a certain extent be quietly and quickly removed. Major Sykes argues that air craft will not supplant cavalry for reconnaissance work, but will act with it and save much unnecessary labor and waste of time. There must be remembered also the impossibility of air craft doing satisfactory reconnaissance work in fog, at night, and in high winds. In addition, air craft reconnaissance is essentially quick, and the field of observation is not very detailed. Another important point made by the Major is: "As regards wind, I think it is fair to assume that aeroplanes will be able to fly five days out of six at one time or other of the day. . . . Under present conditions, and for any considerable period even in fair weather, it may be estimated that pilots and observers can only be employed for about three hours during the day; or, say, ten hours in three days." The good Major's remarks, as usual, allow for no further increase in construction or efficiency in aeroplanes.

The drawings are by W. B. Robinson, special artist for the *London Illustrated News*.

AIRCRAFT

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LEARNING TO FLY

By ALFRED W. LAWSON

THE principal qualifications necessary for the intending student of aviation to have can be enumerated as follows: ENTHUSIASM, CONFIDENCE, CAREFULNESS, ACUMEN, SELF-CONTROL, EQUILIBRIUM, GOOD EYESIGHT, SENSE OF LOCATION, TENACITY, PATIENCE, PRACTISE, for without any or all of these he can never expect to make a successful aviator, while on the other hand if he has these qualifications, there is no good reason why he should not learn to fly and fly well, without any more chance of meeting with an accident than when automobiling or motorboating.

In learning to fly, however, while ENTHUSIASM and CONFIDENCE are great factors still one must not try to go along too fast but spend even a little more than is necessary in ground work. CAREFULNESS should be the balancing power of ENTHUSIASM and CONFIDENCE. Over confidence breeds recklessness whereas over carefulness produces indecision but a personality containing a combination of the two should make an ideal flyer. ACUMEN, the ability to think quickly and act intelligently, is an important necessity in the makeup of an individual for the reason that conditions are constantly changing and a man's mind should be alert at all times. GOOD EYESIGHT, of course, is indispensable while SELF-CONTROL and EQUILIBRIUM in trying positions are splendid qualities to possess. TENACITY and PATIENCE are necessary when learning for there are times when the student may feel that he is not learning as quickly as he would like to. PRACTISE is the prime feature of learning to fly and one must give the art all the practise that can be afforded.

Before one starts to fly, if he has a great deal of confidence in himself, he is likely to feel that it is an easy matter to go right ahead and fly from the very beginning, but after he has passed over the ground two or three times he discovers the necessity of a great deal of ground work before undertaking to go into the air. This becomes necessary because in learning to operate an aeroplane there are so many different things to think of and until one becomes accustomed to working the controls habitually it is necessary, of course, to learn each control separately. In learning to run an automobile one only has to think of steering to the right or to the left, but in an aeroplane one not only has to think of steering to the right or left but also in steering upward and downward and at various angles as well, which requires the warping of the wings in conjunction with the movement of the rudder and elevator and many other things which I will mention as we go along.

LESSON I.—THE RUDDER

My first lesson in driving an aeroplane consisted of a series of efforts in trying to run the machine over the ground from one point to another about half a mile distant, in a straight line. This happened at the Hempstead Plains Aviation Field on June 21, 1913 at 4:30 o'clock in the morning.

To go to school at such a birdly and wormful hour one must be an enthusiast sure enough. The reason for this early morning work is owing to the fact that the air is usually quiet before the sun comes up and likewise in the evening after the sun goes down. The cause of all atmospheric disturbances is the sun. The rays of the sun heat the crust of the earth, which in turn heats the lower stratas of the air, causing the air to expand and ascend thus necessitating cooler and heavier air sliding into its place, and it is this constant heating and cooling and shifting of the air which makes the winds. The meteorologist might explain the matter with more polysylables and magniloquence but it would all mean the same thing.

The machine that I took my first lesson on was a 35 H. P. Anzani motored Deperdussin monoplane, and in order to make a straight line across the field it was necessary for me to learn how to manipulate the vertical rudder. In the Deperdussin monoplane the rudder is operated by the feet; when it is intended to turn the machine to the left the left foot is pushed forward and when it is intended for the machine to turn to the right the right foot is pushed forward. This is just the opposite method of turning a bicycle which to the beginner seems rather awkward, and I found the first time that I went across the field that it was more natural for me to push the right foot forward for a left turn than it was my left foot, and vice versa.

There is a good reason, however, for this reverse action, for later when one is in the air and making a turn to the left the tendency of the left wing is to drop which is offset by warping the wings and as the warping device is so arranged that one instinctively turns to the right or the high side, the two movements, i. e., pushing the left foot forward and turning the warping wing to the right, are more easily accomplished than if one pushed the right foot forward at the same time as turning the warping wheel to the right.

Concentrated thought and plenty of practise on the foot bar controlling the rudder, however, ultimately makes it just as easy to manipulate as the natural way and increases the safety when flying as well. The connection between the foot bar and the rudder is made by wire cords extending along the fuselage.

Upon my first trip across the field my instructor, Mr. Guy Gilpatric, stood on the top of the fuselage for the purpose of switching off the motor in case it was necessary. He repeated this act for two trips in which he found it expedient to turn the motor off once as the machine swerved to the right and it appeared as though I would not be able to get it back into a straight line again. Beginning with the third trip, however, I was permitted to take the machine across the field and back alone after being cautioned to switch off the engine whenever the machine swerved too far to the left or to the right.

The manner of switching off and on the engine can be operated in three different ways. The usual way, however, is to use the thumb switch mounted on the hub of the steering

wheel, which by pushing it downward permanently cuts off the motor while pushing it upward starts the motor. In addition, there is a short circuit button mounted on the wheel which is generally used when it is desired to shut off the engine momentarily or for quickly stopping the motor in an emergency without bothering with the main switch or gas control which is the third method of cutting off the motor and also of increasing or decreasing the speed.

To the right and attached to the inside of the cockpit are two levers which lead to the engine, one to regulate the flow of gasoline and the other to regulate the flow of air into the carburetor while to the left and inside of the cockpit is the lever connecting with the magneto.

In case that the button or the rod switches should not work at any time, by pushing down the gasoline lever and stopping the flow of gasoline, the motor can be shut off if necessary. The lever connecting with the air valve I was taught to operate after the third trip by starting the machine with the valve closed and as soon as it got under way, opening it up. During one trip, however, I forgot to open the air valve and went across the field at a speed of about thirty-five miles an hour according to Mr. Gilpatric; a little too fast for the first lesson and therefore I was cautioned to be more careful.

It required several days to complete my first lesson and get to the point where I could utilize the rudder with precision, and as I afterwards found the rudder is the most difficult of all the controls to learn to operate.

LESSON II.—THE ELEVATOR

My second lesson in flying occupied a period of several days and consisted in learning how to work the elevator. Just as the rudder is used to steer the aeroplane from left to right or from right to left, so is the elevator used to steer the aeroplane upward or downward. The elevator on a Deperdussin monoplane is located at the extreme end of the tail of the machine. It lies in a horizontal position when on the ground and has the appearance of a flap which is pulled up and down from the pilot's seat by connecting wires which are attached to the steering wheel.

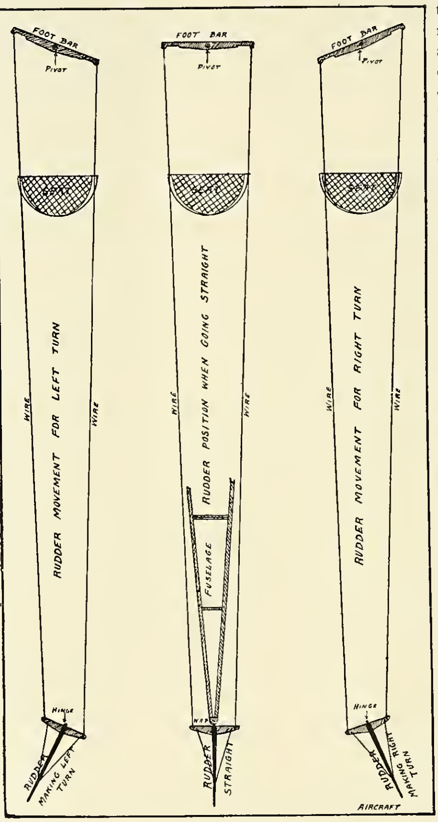


Diagram showing the working of the Rudder Control in a Deperdussin Monoplane.

The operation of the elevator consists of pulling the wheel upward when one wants to go up and pushing it downward when one wants to go down—a very simple and natural method. The art of flying, however, does not consist in merely pulling the steering wheel up and down or operating the foot lever so that the rudder is turned from left to right and vice versa, but consists generally in the sense of equilibrium or knowing how to properly balance the machine when in the air. The controls are so delicately arranged that one must not only learn their movements but must arrive at a point where he can feel his way through the air like a bird and change the angles of his wings, rudder and elevator instinctively.

In taking up the study of the elevator my first instructions were to hold the elevator of the machine down low until the tail had lifted well clear of the ground and then gradually pull the control backwards until the elevator levelled out. The idea of this being to hold up the tail which by so doing decreases the angle of attack on the main planes cutting down forward resistance and aiding rapid acceleration of the machine over the ground so that it quickly attains the speed at which the tail will support itself which is usually the speed at which the machine will fly properly.

Before starting my instructor raised the tail of the machine so that it was off the ground and gave me an opportunity of looking over the nose of the machine at the angle he desired me to run across the field. These instructions in themselves were not so hard to follow, but the difficulty came in trying to think of the elevator and rudder at the same time and I discovered to my disgust in running the machine across the field while thinking of operating the elevator that I frequently forgot the foot controls entirely and would give an awful exhibition of making a letter S on the ground and when making a letter S one also must think of another task which is the cutting off and putting on of the power. And again, once when absorbed in the idea of mastering the rudder I forgot completely to bring up the elevator with the result that it lifted the tail so high that the machine came perilously near turning over on its nose while running rapidly over the ground.

So it can readily be seen that with each new lesson there is brought into play additional things to think about which keep the driver constantly on his mettle. To watch the motor, rudder and elevator all at the same time is a task which the new beginner usually requires a few weeks training to do properly.

In learning to operate the elevator I found myself off the ground several times without knowing it by pulling the steering gear back a little too far, and once I found myself ten or fifteen feet up in the air and still climbing before my presence of mind caused me to turn the nose of the machine downward. This happened before I had received word to do it, and both my teachers, Messrs. Bonney and Gilpatric, scolded me for leaving the ground without instructions. My desire to get back to the earth as quickly as possible caused me to turn the nose of the machine down too suddenly, which gave the machine a jolt when it struck the ground and caused it to bounce upwardly again and then settle down gradually. There was no harm done, however, and the experience was, I must confess, a most delightful one, notwithstanding it was a little premature.

There are many disappointments in learning to fly just as well as there are many thrills. Sometimes one feels that he is the master of the machine while at other times it feels to him like a balky horse trying to cut up capers, but when the machine appears the hardest to handle is just the time the pilot is learning the most for it makes him think and it makes him think quickly and it brings out forcibly in his mind

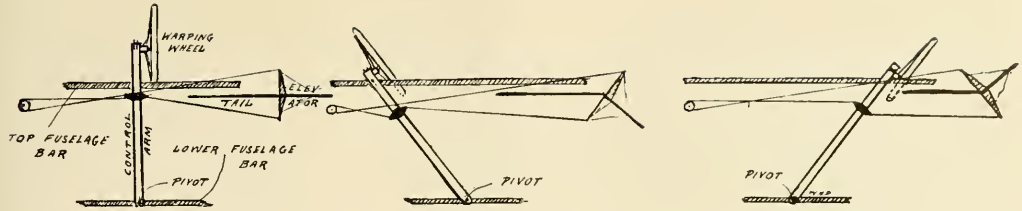


Diagram showing the working of the Deperdussin elevator control.

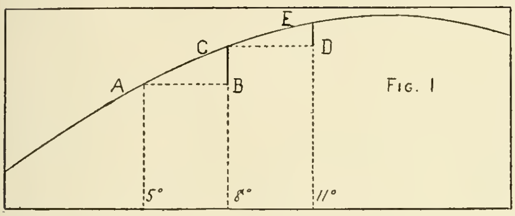
the intricacies of both the theory and practise of flying.

It takes a higher grade of intelligence to fly a machine than it does to run an automobile, just as it takes a higher grade of intelligence to run an automobile than it does to drive a horse or an ox, but the thrills are more acute and the fun of flying a machine is incomparable; as far as I am concerned it affords more real enjoyment for me than any other sport I have ever taken up and is infinitely more interesting than the ordinary playful sports by reason of the fact that it trains one's mind scientifically in mechanical and physical laws and one feels that while extracting great pleasure from operating an aeroplane he is also helping forward the world's greatest movement in transportation methods and thereby turning the energy expended in recreation into useful and progressive channels.

(To be continued in September AIRCRAFT.*)*

STABILITY IN FLYING MACHINES

By ALBERT ADAMS MERRILL



THE problem of stability in heavier-than-air machines is difficult to solve, owing principally to the fact that the roadbed on which a flying machine travels is never still. Not only does this introduce a variable factor into the problem, but, as the air is invisible, it is not possible to know beforehand the nature of the change which must be met. This condition of affairs is inherent in the nature of the air itself, cannot be controlled, and must always introduce an element of uncertainty into flying, which element is lacking in other modes of travel.

Any movement a flying machine may make can be resolved into two components; a translation of the c. g. and a rotation about the c. g. A translation of the c. g. will have no effect upon stability and will not be considered in this article, which will deal only with rotation about the c. g.

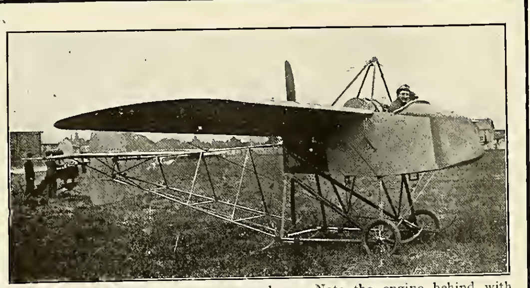
In a flying machine there are three axes of rotation, vertical, lateral and longitudinal. Rotation about the vertical axis does not affect stability; rotation about the longitudinal axis affects lateral stability, which, altho an important problem, will not be considered here, as I wish to treat particularly of longitudinal stability or rotation about the lateral axis.

Rotation about the lateral axis is of two kinds and may be called diving and stalling rotation. The peculiarity of these rotations is that both cause a great change in the forward speed of the machine. The former increases and the latter decreases the speed. Provided the machine is not too near the ground, no great danger occurs with a diving rotation unless the machine has a low factor of safety for its top guy wires. This is because the increase of speed means greater ease of control and recovery can be made in safety, always provided there is enough room and provided the machine can stand the downward pressure created by a too sudden diving rotation.

A stalling rotation, however, is much more dangerous than a diving rotation. This rotation, by decreasing the speed, decreases the ease of control and may lead to such a loss of control that the machine will fall sideways or even backwards. The peculiarity of the present type of machines, monoplanes and biplanes, is their inherent tendency to stall. The flying angles common today lie between 4° and 7°, and with all existing machines when this angle is increased the center of pressure rushes forward and this introduces a stalling rotation. This phenomenon is inherent in all cambered surfaces and cannot be eradicated so long as the supporting surfaces are disposed either as mono or biplane. Tails and stabilizers (such as Doutres') do not help matters because they do not touch the root of the problem; they simply cover up, more or less successfully, an inherent weakness.

The problem before us, then, is this: How can supporting surfaces be so disposed as to have no inherent tendency to stall? It is possible to show how this can be done simply by a close analysis of the lift graph of any given cambered surface. Figure 1 is such a graph taken from Eiffel and represents the lift graph (Ky) of a circular arc with a camber of 1 in 13.5. The important thing to note is this: As the angle increases, the value of the tangent to the graph decreases until at 14° (about) the value is 0 and at higher angles it becomes negative.

If we draw ordinates at 5°, 8° and 11°, these ordinates cut the graph at A, C and E. If we draw abscissae at A and C we get the lines AB and CD. If we start a surface at 8° and move it to 11°, its increased lift will amount to DE, but if we start it at 5° and move it to 8°, its increased lift will amount to BC, which is greater than DE. In each case we have moved the surface thru 3°, yet we get different ratios of increased lift according as we start from a large or a small angle. Evidently, then, to prevent stalling all that is necessary is to use two surfaces, one behind the other, so placed that under all conditions of flight the angle of the rear surface is smaller than the angle of the front surface. This is the theory which accounts for the longitudinal stability of converging tandem surfaces, which stability has been demonstrated by Eiffel.



The latest Borel military type monoplane. Note the engine behind with the propeller mounted on the upper tail boom.

Foreign News

BY

Arthur V. Prescott

Austria

SEVERAL NEW WORLD'S RECORDS ESTABLISHED AT THE VIENNA MEETING.

The International Aviation Meet at the Aspern aerodrome, Vienna, on June 15-23, saw some remarkable performances, including the breaking of several records. On June 15 Perreyon, on a Blériot, fitted with a 160 H. P. Gnôme and Chauviere propeller, took up two passengers to a height of 4,700 metres in 35 mins., thus beating Lieut. Blaschke's world's record of 3,580 metres. Later in the day Herr Illner on a Lohner took up two passengers to 4,580 metres, and the next day he improved on this and Perreyon's record by taking his two passengers to an altitude of 5,180 metres. A speed race of 4.5 kiloms. resulted in a win for Audemars on a Morane, and in a turning contest Chevillard was easily the victor on his H. Farman, while Bregi on a Breguet made the longest flight with passengers.

Perreyon, however, won the climbing competition, going up 1,000 metres in 2 mins., while Audemars was second in 2 mins. 5 secs. Each alternate day was a rest day, and so the next flying was on June 19th, when Illner won the height prize, going up to 4,170 metres on the 120 h. p. Austro-Daimler-Etrich, while Sablatnig, on a Union Arrowplane, took up four passengers to 1,040 metres. Perreyon, on his Blériot, climbed 2,000 metres in 2 mins. 50 secs., and won the prize offered by the Minister of War. Bielovucic won the duration contest on his Hanriot, with 3 hrs. 25 mins. 3 secs., Bathiat on the Bathiat being second with 2 hrs. 24 mins. 32 secs. Chevilliard demonstrated his specialty, the *chute de cote* (side dive), and Mme. Pallier on her Astra and Mdlle. Steinschneider each made long flights. No flying was possible on the 21st, on account of the bad weather, and on the 22nd there were two bad accidents. In one, Stanger, who was flying a Lohner machine, was in collision with Molla, who was flying a Rep, and not only were both machines smashed, but the pilots were seriously injured, as also was the passenger with Stanger. Soon afterwards Mdlle. Steinschneider had a smash, but she escaped unharmed. A landing competition was won by Garros on his Morane, with Chevilliard a good second on the Farman.

The events postponed from Saturday were to have been held on Monday, and a large crowd gathered, while the Emperor Francis Joseph was also present. A cloud was thrown over the proceedings, however, when it became known that Lieut. Nepallek, who was the passenger with Stanger on the previous day when his machine was wrecked, had succumbed to his injuries. The race from Aspern to Neustadt and back was won by Garros in 40 mins. 34 secs., Illner, with two passengers, being second in 48 mins. 10 secs. Mme. Pallier won the height event for ladies, and Bregi, Tetard and Chevilliard each gave exhibitions in their own special styles.

Belgium

NEW BELGIAN HEIGHT RECORD.

On June 18, at Ghent, Crombez, on a 80 h. p. Deperdussin monocoque, beat the Belgian height record of 2,800 metres, which stood to the credit of Tyck, by rising to a height of 3,800 metres in a flight which lasted 45 minutes.

Chili

CHILI ORGANIZING AERO CORPS.

The Chilean Government having decided definitely to organize an aero corps, has set about to do it on a proper scale, ordering a number of special school machines as well as military monoplanes and two 80 h. p. tandem monoplanes of the type on which Perreyon recently broke the world's altitude record with a passenger and the cross-country record with two aboard. These machines, which are all Blériots, recently passed their reception trials at the Blériot aerodrome at Buc.

Cuba

PARLA, CURTISS PUPIL, TO HEAD CUBAN AERO CORPS.

Augustin Parla, the young Cuban aviator, who recently made the Key West-Havana over-water flight on his Curtiss hydro, without any boat patrol and after only two weeks' training, has been appointed chief instructor in the new Cuban army aero corps, for which the government has voted the sum of $50,000.

England

ENGLAND.

HAWKER ON NEW SOPWITH TRACTOR ESTABLISHES NEW BRITISH HEIGHT RECORD.

On June 16th, at Brooklands, Mr. Harry G. Hawker, on the 80 h. p. Sopwith tractor biplane, which is now fitted with balanced ailerons, put up a new British altitude record for pilot and passenger by rising 13,400 feet. On the same day he also broke the British record for an altitude flight with two passengers, by rising 10,800 feet.

AIRSHIP BETA VISITS LONDON.

On June 16 the little British army dirigible, "Beta," after carrying out some manoeuvres at Windsor, flew to London, passing directly over the city and encircling St. Paul's Cathedral at ten minutes past two. She then went off in an easterly direction and passed over Ilford at about 3 P. M. At 5:30 the ship again passed over London on her way back to her hangar at Farnborough.

France

BRINDEJONC DES MOULINAIS COMPLETES 3,100 MILE AIR TRIP OVER EUROPE.

Brindejonc des Moulinais, the great French aviator, who, as we recorded last month, had flown from Paris to Warsaw, Poland, via Berlin, continued his flight on to St. Petersburg, Russia, and not being content with this, determined to fly back to his starting point by way of Stockholm, Copenhagen, Hamburg and the Hague, which he succeeded in doing successfully, reaching the aerodrome of Villacoublay, near Paris, on July 2. The trip was started on June 10 and could have been accomplished in considerably less time had the aviator chosen to do so. Instead, he gave exhibitions at some of the different places, and in addition was received by the sovereigns of Russia, Sweden, Denmark and Holland. The last stage of his journey from The Hague to Paris was remarkable in that it was accomplished in a strong wind and heavy rain.

FIRST TRY FOR THE AE. C. F. CRITERIUM.

The first try for the Ae. C. F. Criterium, the rules for which have been so altered that instead of it being awarded for an aerodrome flight, it will be given for the best out and home non-stop flight across country to a point at least 500 kilometres from the starting place. The first attempt was made on June 16th, when Gilbert, on his Rhone engined Morane-Saulnier, started from Villacoublay with the intention of going to the Croix d'Hins aerodrome at Bordeaux and back. The outward trip was accomplished in faultless style, and after two rounds of the Croix d'Hins aerodrome had been made without alighting the return trip was entered upon. The plucky pilot was, however, forced to land near Poitiers after a non-stop flight of over 700 kilometres on account of the strong wind which suddenly came up. Later he re-started and flew back to Villacoublay, thus covering 1,014 kilometres in the day, but without it counting for the Criterium owing to the landing made.

GOOD TRY FOR MICHELIN CUP.

On June 16 Cavelier, on a 50 h. p Rhone Deperdussin and flying over a course of 111 kilometres from Etampes, made a plucky attempt for the International Michelin Cup. Starting at 5:50 A. M., he found the mists very thick, but this did not deter him in his task. As the day wore on the intense heat set up very dangerous wind currents, but in spite of these difficulties he made eight complete circuits of the course, and when he finished at 7:30 P. M. he had covered 888 kilometres. Later he made another round, so making his record for the day 999 kilometres. The next morning at 6:15 he re-started and completed eight more circuits, so that his total distance for the two days' flying was 1,887 kilometres.

NEW GNOME MOTOR.

Soon the Gnôme Co. will be introducing a new 50 h. p. motor, which will be known as the "monosoupape" or single valve type. It is said to give 72 h. p., while the consumption of petrol is very much less than in the ordinary type 50 h. p. Gnôme.

TESTING THE NEW BOREL.

Daucourt has recently been busy testing the new military type Borel monoplane, which has the propeller placed behind the main plane, the pilot and passenger being seated side by side at the front of the fuselage, and thus being able to get a full view of everything below them. A photograph of this interesting machine is shown at the top of this page.

Germany

ANOTHER NEW ZEPPELIN GIVEN ITS TRIALS.

On June 8 preliminary trials with the Zeppelin Z 19 were held at Friedrichshafen and proved very satisfactory. At the completion of these trials the German fleet of airships will be enriched very shortly by three new Zeppelins. The Z 19 is to replace Z 1 and is the nineteenth ship turned out by the Friedrichshafen works. Another vessel, the twentieth constructed at the Zeppelin works, has also been finished and given preliminary trials. It will be listed as number five. The third is intended for the navy and is to be stationed at Johannisthal. The new Schuette-Lanz, a Parseval No. 4 and a reconstructed Gross M-4 will all belong to the army before the end of the year. The total additions in the course of 1913 would therefore be 4 Zeppelins, 2 Parsevals, a Schuette-Lanz and a Gross.

HYDRO-AEROPLANE STATION ON LAKE CONSTANCE.

The Association of the German Aero Clubs of the South has organized a contest for hydro-aeroplanes to be held on Lake Constance in the near future. The committee has received the following entrants: 3 Otto biplanes, to be piloted by Weyl, Baierlein and Lindpaintner; 2 Aviatik biplanes, to be piloted by Faller and Stoefflar; 2 machines constructed in the Flugwerke factory at Friedrichshafen, one a biplane, the other a monoplane, both to be piloted by the well-known German aviator, Gsell; 1 Ago biplane; 1 Rumpler monoplane and 1 Gotha biplane, to be piloted by the former well-known runner, Bruno Buchner, and, lastly, a monoplane constructed by Stracke, who will pilot the machine himself.

On June 16, at Johannisthal, Thelen, on a military biplane, succeeded in breaking the German height record for pilot and three passengers by rising to a height of 2,150 metres.

An equipment which will enable a hydro-aeroplanist to breathe below the surface of the water, in case of accident, or for use in high altitudes, has been invented by Messrs. Dragerwerck, of Lubeck. It consists of a breathing apparatus and a life-saving swimming vest of rubber-coated fabric. In the case of a fall into water, the airman wearing the device would merely have to place the mouthpiece in his mouth and open the valve.

As an evidence that airship building has become a momentous business undertaking the Zeppelin directorship recently announced that it had orders for $11,200,000 worth of airships, which means approximately orders for 40 airships, and the works are now turning out one airship per month, which is equivalent to turning out $3,120,000

worth of airships a year. Director Colsman, of the Zeppelin Company, announced in Vienna after the arrival of the airship "Sachsen," that there were no further reasons now in the way of a Zeppelin undertaking a flight across the Atlantic Ocean and that it could be done any time he chose and would probably be done soon.

Mexico

The Mexican Government having decided to organize a flying corps for their army, has placed an order with Blériot for twenty two-seater machines to be fitted with 80 h. p. motors.

On June 11 a party of 31 Mexican officers arrived at Buc to undergo instruction at the Blériot School.

Russia

On June 21st, at Sebastopol, Capt. Semitaine, on an 80 h. p. two-seater Morane-Saulnier, with a passenger, beat the Russian height record recently made by Gaber Vlinsky. He climbed 3,000 metres in 28 minutes and descended in 4 minutes.

FOUR HUNDRED H. P. AEROPLANE FLIES OVER ST. PETERSBURG.

On June 11 Sikorsky, on his mammoth biplane which has four motors of a 100 h. p. each, accompanied by four mechanics and the pilot, Jankowsky, flew from St. Petersburg to Gatchina. After making a circuit of 40 kilometres in that neighborhood the machine returned to St. Petersburg and was flying over the city for half an hour. During the trip the passengers changed places several times without affecting the balance of the craft.

AERIAL DREADNOUGHTS FOR RUSSIA.

The development of the aerial armament of Russia is making immense progress according to the Chief of the Army Staff, who recently in a debate in the Duma related details of what had been done.

He said the Russian Ministry of War would not rest until a flying squad had been established in every army corps.

The Government, he said, had doubled the number of dirigibles recently. It had acquired airships which were provided with machine guns, bomb throwers and wireless telegraphy.

Spain

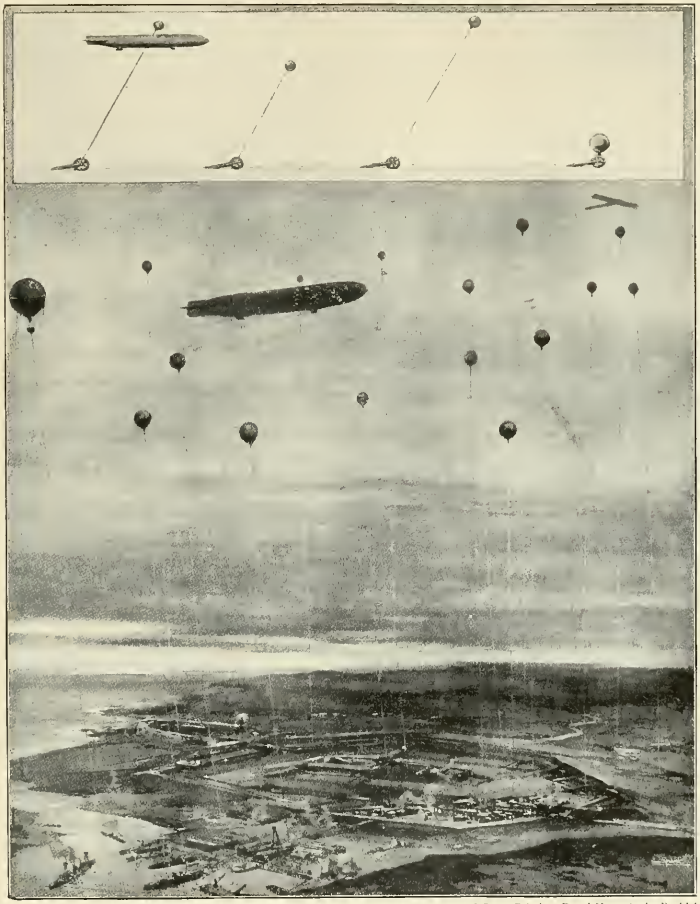
A GOOD CROSS-COUNTRY FLIGHT

M. de Pombo Piharra, who recently passed his license tests at the Blériot School at Pau, decided that as a fitting termination to his training he would fly his machine home from the school. Accordingly, having taken delivery of a new tandem Blériot, he set out from Pau, and crossing the Pyrenees at a height of over 6,000 feet, flew straight on to Madrid.

Late Cable News

COVERS 590 MILES IN TRIP FROM PARIS TO BERLIN.

On July 14, Leon Letort, a French aviator, made a flight from Paris to Berlin without a stop. He left Paris at 4.10 a. m., and landed at Berlin at 1.10 p. m. The distance covered was about 590 miles.



The above drawing illustrates the idea of Engineer-Commander George T. Simmons of Great Britains, Royal Navy, (retired) which he offers as a plan for the protection of important positions from air craft in time of war.

In a letter to the Illustrated London News, he says: "The lower area being protected by vertical gun fire it only becomes necessary to mine the part above as far as practicable. This I propose doing by mine-balloons. At each spot where an attack from overhead might be expected, a number of air-mines, or small captive balloons, would be kept. Each of these would be attached to a cable fitted on a drum and connected with a suitable wheeled carriage. On the carriage would be fitted a small electric device connected with the cable, and also with a highly exposed charge in the balloon. The air mine would be allowed to ascend to the desired height and sent up higher or drawn lower as required. In the event of an airship approaching the position thus mined the mine-balloon nearest to it would be exploded by the man in charge of its carriage."

On the left of the larger drawing is a captive observation balloon.

Evidently the retired officer received his idea from mining the waters for battle ships. The same principle, however, would hardly work in the air for the reason that during the day these mines could be plainly seen and be exploded by the machine guns on either dirigibles or aeroplanes long before they came within the danger zone, while at night the dirigibles could find them with their search lights and destroy them in the same manner.

Furthermore, whatever the results would be, the wreckage and unexploded bombs would all fall back upon those underneath as well. There is only one way to fight air craft properly and that is with other air craft, and the sooner these army officers and navy officers understand this, the better it will be for them.

RECORD NON-STOP FLIGHT.

On July 13, Lieut. Adolphe Leopold Varcin, of the French Army Aviation Corps, accompanied by Sapper Chapeau of the Engineer Corps, made a non-stop record flight for pilot and passenger by flying direct from Pau to Chateaudun, a distance of 360½ miles.

On July 14, the Swiss aviator Bider arrived at Milan, Italy, after making a flight over the Bernese Alps from Berne, Switzerland, a distance of about 115 miles. Bider stated that in passing over the Jungfrau he flew at a height of about 10,000 feet and that he almost despaired at times of getting across this mountain owing to the rarified air and that it took two hours of perilous endeavor to surmount the peak.

Description of the New Leveque Flying Boat

The new Leveque flying boat formerly the Donnet-Leveque, is now constructed by M. Leveque and Andri Beaumont and as will be noticed in the accompanying drawing has been slightly altered from the old design. In its new form it appears to have been somewhat influenced by the Curtiss design, for we now find the hull very much deeper and wider with the seats arranged side by side as on the Curtiss. In other respects it retains the earlier characteristics of the Donnet-Leveque hull, viz: the upswept stern to eliminate drag and the triangular shape of the hull at the rear. The hull is constructed partly after boat practice and partly after aeroplane practice and consists of a sort of fuselage framework built up with longitudinals and uprights strongly braced and then covered with layers of wood as in boat practice. The centre cellule which carries the motor and fuel tanks is built almost entirely of steel tubing and is joined to the hull by four struts. Both the upper and lower planes attach directly to this centre cellule so that by removing the four bolts which join this cellule to the four struts of the hull, the whole boat part can be separated from the biplane structure. Near the extremities of the lower planes, which are somewhat narrower and of shorter span than the upper ones, are attached the two wing tip floats which are of generous size to protect the tips from going under water on turns or in bad starts and landings.

The upper surface is of considerably larger span and chord than the lower one, having the wing tips swept back and carrying the ailerons at the rear extremities. The main spars of the planes are placed quite near together, thus giving considerable flexibility to the rear of the planes.

The tail of the machine, which is placed quite low and in line with the lower plane, is of generous size and is of the flat non-lifting type to aid stability. It carries along its rear edge a large single flat elevator. Directly above the tail and just in front of the elevator is placed a large upright vertical fin, which has the rudder hinged to it.

The power plant of the passenger carrying machine consists of an 80 H. P. Gnôme which is placed fairly high up between the two planes and drives the propeller direct. The gasoline and oil tanks are also placed high, in fact, they are just under the main planes. The motor has a special shaft and hand crank fitted to it so that it can be started from the seat.

A very ingenious folding landing chassis is fitted to enable the machine to either start from or alight on the land while at the same time by drawing up the wheels it allows the machine to alight on or arise from the water. This folding landing chassis is fitted with shock absorbers and the wheels are of such large size and the whole machine so very light that when operated as a land machine it is equally as successful as a marine flyer.

As a flyer the Leveque is one of the most successful of this type of craft, but like all of these machines with the thrust so high it has a tendency to tail slide when the motor stops. It also suffers from the pendulum effect of the low hanging hull which in this machine is even more pronounced than in others, for not being content with having a low down hull, which is more or less necessary for this type, the designer has for some reason which it is hard to understand, still more exaggerated this swinging tendency by hanging the boat quite a little distance below the lower plane. See drawing on page 138.

REQUIREMENTS ESSENTIAL TO PROPELLER EFFICIENCY

By SPENCER HEATH

SPENCER HEATH is the inventor and designer of the Paragon Propellers. A talent for mechanical science, combined with a broad technical training, well prepared him for his profession of mechanical engineer, in which he was for a number of years employed by some of the largest manufacturing corporations in the Middle West. From 1902 until 1907 he held an engineering position under the Navy Department at Washington. Here he took up also the study of law and, upon admission to the bar, resigned and took up practice before the Courts, Patent Office and Government Departments in Washington. In the Government Service he was a close observer of the experiments and researches of the late Professor Langley and later, in his patent practice, was largely engaged with aeronautical apparatus. For the year 1911 he was engaged by the Gyro Motor Company of Washington as General Manager and Consulting Engineer. At the close of 1911 he became General Manager of the American Propeller Company. Mr. Heath is a man of versatile and widely varied interests.

Almost the first essential is to get a correct idea of the true function of a propeller. One way to approach this is to state what it is not. A propeller is not the origin or source of any power whatever, nor has it nor can it have any capacity for increasing the power of any motor. Its sole function is the transmission of power. It plays a part entirely analogous to a line of shafting, a train of gears or a system of belting. It transmits power just like any other transmission device, changing the form of motion and applying the power in a different way and direction from that in which it receives it. It can never transmit any more power than it receives. Its usefulness depends upon the effectiveness with which it transmits usefully the power received, and, in common with all other transmission devices, there is an inevitable loss.

Of course, the propeller absorbs and, in a general sense, transmits one hundred per cent. of the power developed by the engine or delivered to it through any intermediate transmission that may be used between the engine and propeller. The question of efficiency hinges upon how much of the power actually absorbed and transmitted by the propeller is transmitted usefully, and this depends upon a great variety of conditions, both within and without the propeller itself. For this reason there can be no discussion of, and I can form no conception of propeller efficiency in the abstract. It is only in relation to the conditions under which the propeller is used that it can be considered as efficient or otherwise for converting the power received by it into useful work of the kind desired. There is, in fact, no such thing as an efficient propeller in the abstract, for its efficiency depends wholly upon its adaptability for useful results under given conditions. A propeller that would be highly efficient under one set of conditions might be extremely poor under wholly different conditions. (By conditions I refer to almost anything connected with the aeroplane or other structure to be propelled.)

This takes into account the amount of power delivered to the propeller, the speed of revolution of the propeller, the size, weight, general construction, etc., of the aeroplane,—all of which combine to give it a greater or less degree of head resistance when moving through the air. The propeller must then be adapted to the power received (with its r. p. m.) and the resistance to be overcome. The speed with which it overcomes this resistance multiplied by the amount of resistance at that speed determines the actual power transmitted usefully by the propeller. This divided by the gross power delivered to it represents the efficiency, but it represents the efficiency only for a particular case and not in any general sense as referring to the propeller, for the same propeller would have an entirely different efficiency under any radical change under any of the conditions mentioned. Quite often it is assumed that for a certain kind and size of engine there is a certain kind and size of propeller which should be used, wholly disregarding everything in regard to the aeroplane itself. It must be remembered, however, that in order to design an efficient propeller it is quite as important to know the properties of the machine which the propeller is to drive as it is to know the properties of the engine which is to drive the propeller.

Probably the most rational way—one that is very common with me—of approaching the propeller problem for any machine is to estimate first of all the head resistance of the machine at different speeds covering its probable speed capacity with the engine power available. This shows at once the range of net power that must be usefully applied at different speeds. The next thing to consider is the probable best efficiency with which this net power can be transmitted, taking into account, first and most important of all, the diameter and rotational speed of the propeller. This should be looked into from the standpoint of using two blades and also three blades (rarely four).

As in any well-designed propeller, the principal loss is through slip, the purpose of the above is chiefly to ascertain what size and kind of propeller will have the most desirable amount of slip. I do not say the least slip, but the most desirable, the "optimum" (a most excellent Latin word adopted by German technical writers). Now, there is undoubtedly a definite relation, under a given head resistance and rotational velocity, between the diameter and the amount of slip, both for two-bladed and three-bladed propellers. This, so far as I know, has never been definitely worked out and proved by laboratory experiment or otherwise. The experienced designer, however, develops a knack of estimating the slip belonging to a two-bladed propeller, and there is a simple formula for estimating the equivalent diameter in three blades, the diameter of a three-bladed propeller of equal slip being about 85 per cent. of the two-blade diameter.

It is to be noticed that at present the amount of slip must be estimated by the judgment of the designer. It may be thought from this that the entire problem might be solved by judgment alone. The difficulty is that any judgment of the slip must lie betwen certain different extremes of, let us say, from 15 per cent. to 35 per cent., which would represent enormous differences in the propeller daimeter; the designer, therefore, should be able to make a very close estimate of the slip, provided he has any fair amount of data on the actual performance of different machines. As soon as the desired slip has been ascertained or calculated back from the diameter, number of blades and r. p. m., the amount of power lost in slip is readily ascertained by multiplying the head resistance by the slip in feet per minute, or the gross power of useful propulsion and the slip combined is found by multiplying the head resistance and the pitch speed. This, however, is not the total gross power, since there are other losses in addition to slip. If there were no other losses, the minimum slip would be the optimum. These other losses depend upon the peripheral velocity of the blades and also their form and nicety of design and construction. These losses, however, within the limits of good designing, are probably very small in comparison with the slip loss, but they may become large in a case where a propeller of large diameter is running at high speed. This multiplies friction and creates a turbulence or churning in the air that is very undesirable. They are also large where the blades are not of good stream-line form or the pitch of its different parts is irregular or departs into wrong direction from the true screw. Probably 30,000 feet per minute is as fast as any blade tip should travel through the air if turbulence and undue friction is to be avoided. This, of course, argues for slow turning propellers. There is, however, a low limit which is probably about 24,000 feet per minute for the usual run of direct-connected propellers but it depends very much indeed upon the amount of area swept by the propeller or propellers in relation to the head resistance of the machine. If the propeller or propellers are very small, slow r. p. m. will reduce friction losses to a minimum but there will be an enormous increase of slip; but if the propellers are large or several are used, the peripheral velocity of the blades may be kept low without undue slip losses.

Another way to look at it is to remember the fundamental formula for energy of acceleration, $\frac{1}{2}MV^2$, M representing the mass of air moved in a single revolution and V the slip or distance it has moved. If, therefore, V (slip) is to be small, M must be large.

The foregoing considerations lead to no further than the ascertainment of the diameter and number of blades suitable to a given case or power, r. p. m. and head resistance. It remains to consider such matters as blade formation, both sectionally and in outline as viewed axially, and also the distribution of its pitch radially, whether uniform or otherwise.

For these matters it is necessary to draw on a variety of sources. From the laboratory work of Eiffel and others, we ascertain a great deal of the principles governing suitable blade form at a given velocity and angle through the air. The angle and velocity are, of course, determinable from the known slip and revolutions per minute. The properties of each blade and section can thus be worked up in detail and individually designed on the drawing board, baving, of course, at the same time, due regard for strength and distribution of material.

Studying the dynamics of each blade section from the standpoint of a true screw, we generally find unfavorable gliding angles for certain sections of the blade, particularly near the hub and at the extreme tips. This leads to a modification of pitch, making it maximum at about 75% blade length from the hub with a slight gradual reduction toward the tip, and also somewhat greater reduction toward the hub. The plotting of the pitch distribution should be a smooth curve, gradually rising from the hub toward the end of the blade but diminishing from 5 to 15% in the last one-fourth of its length. The dynamics of the various blade sections can be plotted on the same diagram showing the distribution of slip, torque (drift), thrust, etc. Integration of this data, graphically or otherwise, works out the total dynamics of a propeller in a very interesting manner.

In determining the width of each blade section, it is to be borne in mind that its function is to change the direction of air flow by the amount of the angle of attack. A greater width only adds to skin friction without useful result. The cambre should bear a due proportion to width, a wide cambered blade being called for where the angle of attack it greatest. Narrow flat blades should be used for high velocity and low angle; wide blades must be curved in order that their after portion may become effective.

As regards blade outline, good results seem obtainable with a great variety of forms, so much so that it is almost immaterial within a considerable range, provided the form is not such as leads to unfavorable deformation, seriously affecting the pitch. In a substantially straight blade there is a tendency for the pitch to increase owing to the center of air pressure being near the leading edge. Curving the blade backward so that its following edge is slightly concave has been found to correct this. Such an outline, therefore, is most to be desired where the pitch is to remain wholly unaffected by the thrust on the blade.

It may be considered as desirable that the pitch of the blade should remain constant at all times but there are many considerations pointing to the advantage of so arranging the blade form that the pitch will increase or diminish under a greater or less load. It is to be remembered that the thrust on a propeller is by no means uniform. It varies in fact with every variation of air conditions, load and flying angle of the machine. When running along the ground or water, the thrust of the propeller must overcome the inertia of the machine in addition to all other resistances. When in the air, the head resistance and, therefore, the thrust of the propeller is different in climbing, horizontal flight and in descent, changing also with every transient change in the direction of flight or condition of air. With these facts in mind, it may be seen that a propeller which has the property of modifying its pitch inversely with its thrust would better adapt itself to the widely different conditions and give more constant efficiency and uniform results throughout all irregularities of flight and variations in air conditions.

Such a result is obtained by increasing the backward curve of the blades until the rear or following edge is decidedly concave, after the manner of what are called Weedless propellers in marine practice. With this form of blade any slight deflection due to thrust is accompanied by a slight twisting or turning of the blade which diminishes the pitch of its outer and most effective portions, this change in pitch responding instantly to variations of thrust.

Now it is a known fact that the great head resistance of a machine when starting is a check upon the engine speed below speed of flight. The engine is, therefore, not giving its maximum power until after it is well under way although the head resistance which the thrust must overcome is maximum. If, however, the pitch diminishes under these conditions, the engine can turn at its full speed and therefore deliver its maximum power for getting away. Once in the air, however, a diminished head resistance allows the pitch of the propeller again to increase, thus preventing the engine from racing and making its full power available for forward speed. There is thus established an equilibrium between the elasticity of the blade and the resistance of the machine, making the blade smoothly adaptable to any large or small change of conditions that may arise and keeping the engine under a somewhat yielding and uniform load.

A special feature of this blade is that its flexibility is obtained solely by its form and design and without the sacrifice of weight or strength in any way to make it elastic. Flexible blades have been proposed, and to some extent used, by others, but so far as I know, they have obtained elasticity at the expense of strength and without any regard to a modified pitch, which is, of course, by far the most effective way to obtain any marked results from its flexible properties.

The idea of flexible blades has been discussed with some favor at various times and places in connection with marine propellers, but so far as I know, no decisive experiments have been carried on. I think, however, that regardless of

what may be best for a marine propeller, the fact that the air is an extremely elastic and changeable medium lends great probability to the elastic blade playing an important part in aeronautical work.

Regarding material and construction, there is little to be said that would not already be obvious to almost any engineer. For direct-connected propellers the most serious stresses to be cared for are centrifugal. The material, therefore, if fibrous, should have its greatest strength radially. In fact, a fibrous material seems best inasmuch as great tranverse strength is not demanded. Bending stresses, while they may be large in many cases, are very largely counteracted by centrifugal force as soon as there is any deflection. A well designed propeller of White Oak with Spruce interior, however, is capable of withstanding perfectly enormous bending stresses, as has been demonstrated in practical tests.

More important than strength, therefore, is uniformity of material and resistance to wear. You are doubtless aware of how each lamination in a Paragon Propeller originates at the hub and is almost a perfect duplicate of corresponding laminations in the other blade, as regards both the nature and quality of the material and the appearance and grain of the wood. This insures the best uniformity in the shape and the pitch of the blades under all conditions.

As regards strength and durability, I believe that so far as any wooden construction is concerned, no material can be obtained that possesses greater durability than quartered white oak for the exterior portions, with only a reasonable weight which is obtained by the use of Spruce for all of the thicker and more bulky parts.

Whether sheet metal covering for the ends of the blades will be generally required remains to be seen. It is probable that so far as wooden construction is concerned, the limit of durability and other desirable properties of the material has been very nearly reached. For the future, I look to the development of hollow drawn steel as a possible successor to wood, and shall be very glad when the conditions arrive to justify experiment in that line.

Summing up the whole matter, the most desirable propeller is the one having adequate traction on the air to overcome the head resistance of the machine without undue slip; one that is so proportioned in slip and diameter as not to introduce excessive peripheral velocity in the blades; one that has carefully and considerately designed aerofoil sections in every part; one that has either a constant and uniform pitch, radially considered, or preferably a well considered variation therefrom in the right direction, as indicated; one that has a blade outline insuring a permanence of pitch under the deflection caused by the thrust, or preferably a pitch increasing and diminishing somewhat with changes of thrust; one possessing material of the utmost strength in a radial direction, the most perfect uniformity of grain and texture of the blades, the greatest toughness consistent with a reasonable weight, the latter preferably secured by making the interior and unexposed portions from material of comparatively light weight. All of these qualities are fairly obtainable in actual practice and their benefits in the best of present construction have been tolerably well achieved. From this it would seem that the work of the immediate future lies somewhat in the direction of experimental adaptation of the general principles to establish more accurate and definite laws and relations that will make the designing and adapting of a propeller to a given machine more nearly an exact science than it otherwise would be.

THE LEADING AEROPLANE PROPELLERS

With Comments on their Design and Construction

By WALTER H. PHIPPS

As all successful flying machines depend to a large etxent on the efficiency of their propellers, it is interesting to study the different types and to learn just what are the essential requirements in propeller design that make for efficiency.

Since the theory and design of propellers is more or less of an abstruse nature, and as each manufacturer has his own ideas in regard to this subject, it is practically impossible to form any fixed rule governing all propellers. In consequence, most aeroplane manufacturers have left this branch of construction alone, preferring to let the different propeller manufacturers puzzle it out according to their own theories.

For these reasons we have communicated with some of the leading American propeller manufacturers and are publishing herein their ideas on the subject.

But before presenting these it is well to study some of the leading foreign propellers, for without doubt the manufacturing of propellers has assumed a far larger proportion abroad than in this country. Perhaps no other propeller has attained such a world wide reputation as the Chauvière, which ever since Blériot's historic crossing of the English Channel on July 25, 1909, which was accomplished with the Chauvière, has held its own against all competitors the world over and has in a great many cases been the fundamental basis of design for a great many other makes of propellers which have since come into prominence. There is perhaps no other propeller which holds so many world's records, and for this reason it should be studied.

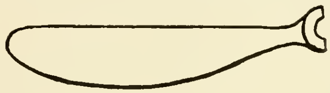
A principal characteristic of the Chauvière propeller lies in the shape and form of the blade, which is illustrated in an accompanying line cut diagram. The cutting parts are the curved edges, the rear edges being straight, the effect of this is to allow the part of the air pressure to be brought behind the axis of the propeller, viz., on the rear part of the blades, thus avoiding deformation of the blades, which tends to alter the pitch. As the Chauvière propellers are exactly calculated for certain motors and machines and are designed to accomplish the maximum thrust under the given conditions with a given pitch, the Chauvière propeller is not designed to flex very much, which is a fault with poorly designed and cheap copies of this type of blade. There are, however, propellers of other makes which make a special feature of the flexing blade and are specially constructed to this end and give excellent results.

Turning to the construction of Chauvière propellers, these are built up in a manner which has become common the world over, viz.: by glueing layers of wood together fan shaped in special presses. In the Chauvière propeller layers or laminations of best quality French walnut are used and these are glued together by a special glue invented by M. Chauvière. Great care is taken to insure that all the wood used is of exactly the same density in its entire length. When the propeller is properly formed or cut out, which is accomplished mostly by hand work, a great deal of attention is given to the balancing of the propellers, which is accomplished by means of a special mechanism invented by M. Chauvière, which registers the slightest defect.

Another propeller which has attained considerable success is the French Rapide, which, while of similar shape to the Chauvière propeller, is altogether different in principle, having the cutting edges straight and the rear edges curved.

The Normale propeller, designed by M. Drzewiecki and manufactured by M. Ratamoff Co., have attained considerable success both in aeroplanes and dirigibles. They are of peculiar shape, having the blades with both the front and rear edge practically straight but with a pronounced S bend at the hub.

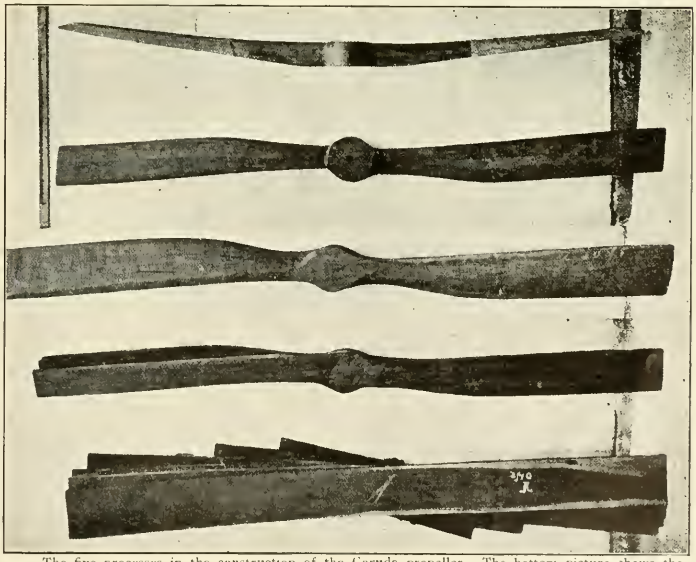
The Levasseur propeller, which also has attained considerable prestige, possesses a number of interesting features which merit consideration. The chief peculiarity is the shape of the propeller, which is of a very pronounced S form, with the leading edge of each blade the concave part of the S and the trailing edge the convex.



Sketch of the Chauvière blade. The round part is the leading edge.

In Germany there are a great number of makes of propellers, but the majority of them are more or less modified copies of the Chauvière type. The two leading makes of propellers used in Germany, however, are the German built Chauvière, manufactured under license from M. Chauvière, and the Garuda propeller, a German make of distinctive design and exceptional accomplishments. This propeller, which has only been on the market a short time, has won many of the leading aviation events in Germany and is rapidly gaining bold in other countries, and is now being manufactured in England, while in addition it is used in Austria and France.

The Garuda propeller is of distinctive shape and novel design and is constructed on a principle hitherto unused in propeller making. It is based on the ideas of Dr. Garuda, who realized the tremendous strain to which the tips of ordinary propellers were usually subjected to by the air pressure acting on them and causing them to bend forward, thus deforming the blades and greatly diminishing efficiency. He conceived the idea of constructing a propeller having the blades set at a dihedral angle with the concave part facing toward the direction of flight, which when this type of propeller is running all out the backward component produced by centrifugal force would tend to cause the blades to move backward, thus counteracting the forward movement due to air reaction. If the moments are well balanced all bending strains and deformation disappear, full efficiency is achieved and only the direct tensional effect due to centrifugal force remains and this is taken up along the grain of the wood. In order to give this principle full sway the propeller is



The five processes in the construction of the Garuda propeller. The bottom picture shows the rough planks or laminations being glued together fan shape so as to obtain a rough form of the blade and at the same time save both labor and wood. The three centre pictures show the same propeller in three stages of construction while the top one shows it in its finished state.

made long and narrow, the laminations extending straight through from tip to tip. The process of construction of a Garuda propeller is clearly shown in an accompanying photograph.

England does not possess any large concerns making British designed propellers, but instead we find several of her concerns making the leading types of French and German propellers under special license, thus there is the British Chauvière propeller, the British Levasseur and the British Garuda. This does not mean, however, that the English manufacturers cannot make good

Excelsior Propeller.

propellers, but rather that they have until recently been so handicapped for capital and encouragement that they have not felt justified in spending large sums in building up big propeller factories with which to compete with the Chauvière and Garuda when these could be so easily obtained. There are, however, a number of the aeroplane manufacturers and aeroplane supply dealers who manufacture their own propellers.

In this country the propeller question has been given considerable attention and a number of good engineers have designed and produced some very efficient propellers, but unfortunately there has not been the same tremendous demand in this country for propellers that there is abroad and some of the manufacturers, though producing good propellers, have had to discontinue manufacturing, while

Flottorp Propeller.

others, although they have perfected their propellers to an extent where they equal, if not excel, the foreign types, have not been able to find as large a sale for them as the leading foreign makes.

One of the pioneer propellers in this country was the Gibson, which in the beginning was more or less of the Chauviere type, but afterwards was brought out in several distinctive types which gave highly efficient results. Gibson propellers were made up in a number of styles and used successfully on various American and foreign machines.

Perhaps the most distinctive and original of all American propellers is the Paragon, designed by Mr. Spencer Heath and constructed by the American Propeller Company.

The Paragon propeller is not a copy of any foreign propeller, but it is a distinctive type with several patented features. It has been used successfully by a large number of our American aeroplane builders and in a great many cases has replaced foreign propellers and given better results. Paragon propellers have been used with great success by the Benoist Aircraft Company, The Curtiss Aeroplane Company, The Young Aviation Company, The Mattheson Aeroplane Company, The Rex Smith Aeroplane Company, The American Aeroplane Supply House and many other concerns, as well as by many of our leading aviators too numerous to mention.

The Paragon propellers, which are made up in either two, three or four bladed types, make use of fairly wide blades with both the leading and rear edges rounded off. They are made up of laminations usually of spruce and white oak, but contrary to usual practise do not have the laminations extending through from tip to tip. Instead the laminations of each blade are separate from one another, and are joined at the hub by special tapered joints, which is a patented feature and allows of the laminations being cut to proper and accurate shape before joining them together, a feature which insures both blades being exactly alike. The laminations are reinforced at the hubs and along the blades they are pegged with wooden dowels, which greatly strengthen the whole. The heaviest material is at the ends and is designed to act as a flywheel, though the entire weight is small.

In addition, the Paragon propeller is made up in two new types, one a flexing propeller, the other a pressed and twisted propeller for Wright type machines; these new propellers are illustrated in an accompanying photograph.

The new flexing type of blade is beginning to attract considerable attention. These blades are of full size, thickness and weight like any other, but the outline of the blade is such that a small bending under air pressure produces a considerable change of pitch, the pitch being less as the pressure or thrust increases. Under starting conditions the heavy thrust causes the pitch to fall off enough to give the engine its full running speed and maximum power before it gets into the air. This insures quick rising. Once in the air the diminished thrust allows the propeller to resume its higher pitch, thus holding the engine at normal speed and insuring the highest possible speed of flight. The flexible pitch makes the blade responsive to all variations in the air and irregularities in manipulation of the machine. Upon any increase of head resistance, the pitch diminishes, giving greater thrust. Upon any decrease of resistance, the pitch instantly increases and accelerates the speed. The perfect and instant adaptation of the blade to every change of conditions and to all irregularities, such as choppy air or unsteady control, gives the propeller a smoothness and constancy of action that insures the utmost efficiency. It also makes these blades almost silent when running on a muffled engine.

The Flottorp propeller, designed by Ole Flottorp, is another American propeller which has given a good account of itself and is greatly favored by a good many of our leading aviators. In regard to the Flottorp propeller, Mr. Flottorp writes as follows:

"The efficiency of my propellers is obtained by combining the best qualities of the world's most popular propellers, such as the Chauvière, Normale and Rapide of France. I have also taken the outline into consideration, and make my propellers so that the center of pressure comes in a straight line from the hub to the tip of the blade, which prevents twisting or change of angle in flying, and also eliminates vibration. With this propeller the engine will turn up on turns as well as straight-away flights without slowing up the motor.

"The construction of my propellers is made up in the usual way, by gluing together boards, and I only use the very strongest wood, such as Cuban mahogany, walnut and birch."

The Charavay propeller, manufactured by the Sloane Aeroplane Company, is one of the leading American propellers which has gained a national reputation, and one that has been used on several record-breaking machines. It is constructed in different types, there being several original designs, as well as modified Chauvière and Normale styles.

The Charavay propellers are built up of laminations glued together in the usual manner and finished off with an exceptionally fine and smooth polish. Great care is given to the selection of the materials used and also to the balance of the propeller, which has to be absolutely perfect. A feature of most of the Charavay propellers is the novel construction of the back part of the blade, which, instead of being rounded off, has a sort of triangular ridge running along it, which greatly adds to the strength and efficiency of the propeller. This ridge, which is situated near the leading edge of the propeller, is slightly rounded off on top, but the surface of the wood running from it out to the cutting edge is practically flat.

The Excelsior propeller, designed by J. J. Stone, is one which has during the last year or so greatly come into favor with some of our best pilots. This propeller, which we illustrate in an accompanying photograph, is described by Mr. Stone as follows:

"The blade is flat faced with back convexed. Entering edge rather thick and coming to a thin trailing edge. The extreme end of the entering edge is slightly concaved, with the back at this point convexed. The efficiency of the propeller is produced by suction of the air from the tips which is brought back toward the hub. This produces increased thrust. The pitch of the propeller increased from the tip to the hub, while the greatest strength of the propeller lies in the middle of the blade, where it is of increased thickness to stand the pressure."

The Hall Scott propeller, which is made by the makers of the well-known Hall Scott aeroplane motors, especially for use on their engines, have given such a good account of themselves in different machines that the following communication from Mr. L. S. Scott merits consideration. He writes as follows:

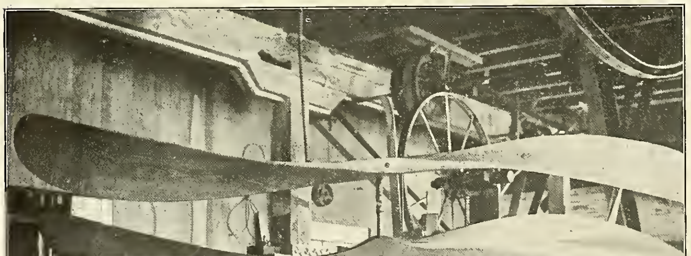
"We began by making a blade that was an exact duplicate of a foreign blade which at that time was giving satisfactory results in Europe. During the past three years we have been changing this propeller considerably and by placing it on our motors and running it on our test stand have been able to make several necessary changes in order to have it satisfactory for our equipment. We have taken our blades and placed them in actual flight with some of our aviators and carefully noted the exact results. It is interesting to note that our propeller for the 60 H. P. Hall Scott motor is but 8 inches wide, has a 5-foot pitch and is 7 feet 6 inches in diameter. This propeller, as well as others for our larger motors, has been carefully tested against other propellers, and for our equipment has given absolutely satisfactory results."

Amongst the aeroplane makers who build their own propellers are the Curtiss and Wright Companies.

The Curtiss propeller, which won the first Gordon Bennett aviation race, is used on most of the Curtiss machines and has proved highly efficient.

The Wright propellers are of the high pitch, large diameter, slow revolving type and are accountable to a large extent for the wonderful efficiency of the Wright machines.

From the foregoing particulars on the different makes of propellers it can readily be seen how abstruse is our knowledge of propeller design and how much there is yet to be learned in this line,



The new flexing type of Paragon propellers. The upper and lower ones are the new flexing Wright type propellers used on the Navy Wright machines, while the central propeller is the new flexing blade fitted to one of the Navy Curtiss machines. These propellers, which are described in this and Mr. Spencer Heath's article, have given excellent results on the Navy machines.

LESSONS OF THE OCEAN TO OCEAN FLIGHT ACROSS THE ISTHMUS OF PANAMA

By ROBERT G. FOWLER

ROBERT G. FOWLER first attained prominence in connection with motor car contests and graduated into the flying ranks in August, 1911. After five days' tuition at the Wright School at Dayton, he shipped a Model B. Wright to San Francisco to compete in the Hearst Prize flight, being the first to enter and the first to start. He had to give up the attempt to cross the lofty Sierra Nevadas after five trials, but made the coast-to-coast flight from Los Angeles to Jacksonville, Fla. During the season of 1912, he was active in cross-country and exhibition work and in September last changed to the tractor type of 'plane and developed its efficiency until it was able to make the trip over the Isthmus of Panama carrying a passenger. During Mr. Fowler's activity as a pilot he has covered a great number of miles in cross-country flying and has done a great deal of passenger work. He possesses the unique record of being the only aviator in the world to start a flight from a railroad track, using the top of a common "tool-car" such as is used by section-men, as a resting place for the landing of his 'plane.

Four hundred years ago Balboa, an intrepid explorer, by dint of much labor and experiencing many hardships, made a trip from the Atlantic Ocean to the Pacific across the Isthmus of Panama, being the first white man to glimpse the placid waters of that ocean.

With all the changes in modes of transportation that have been wrought during the past few centuries, it has remained for an aeroplane to make the fastest journey from one ocean to the other.

Following the course of the Panama Canal and at times circling to obtain better pictures of various points, it was possible to make the distance of fifty miles in just fifty-five minutes with a moving picture camera operator for a passenger in addition to his camera and nearly half a mile of film to be used in securing the first "bird's-eye view" of the Panama Canal.

Upon my arrival in Panama City, I broached the purpose of my trip to that part of the world and was immediately told of varying disasters which had befallen previous airmen who attempted to combat the very unsettled air conditions known to exist over the narrowed-down continent separating the two oceans at this point.

First thing to consider was the lessened buoyancy of the air owing to the higher degree of humidity, then the heat, most of the time about 90 degrees or higher, made it difficult to keep a gasoline motor cool enough to work uninterruptedly for the length of time necessary to gain height to clear the peaks of the Continental Divide at Culebra and carry the heavily loaded plane as far as the Atlantic, breasting the strong trade winds blowing on-shore at twenty-five to thirty miles per hour.

Owing to the fact that there are no clearings of any great area anywhere upon the Isthmus of Panama, I had to provide a hydro-aeroplane capable of starting from and alighting upon the water. This gave me greater security for test flights, but once inland away from the Pacific entrance at Balboa, there was a stretch of twenty-two miles of land "all on edge" upon which it would have been fatal to have attempted to alight.

I had considerable difficulty in obtaining gasoline of high gravity test, the 70 degrees Baume being the highest it was possible to import, as the more volatile grades would evaporate very quickly. After a couple of trial flights on April 12th over Panama Bay, with and without a passenger, testing out the motor and "sampling" the adverse currents caused by the wind on-shore from the Pacific Ocean meeting the wind from the Atlantic fifteen miles inland at Culebra, I decided to try the flight on the first day that the air was clear enough to make it possible to secure pictures of the country beneath.

On April 25th I made several trips, one of a duration of forty minutes, going as far inland as Culebra, where the smoke was so thick it was impossible to make any pictures, so had to turn back to Panama Canal.

Again, on April 27th, it having rained nearly all the previous day, I took to the air with the camera man and full supply of oil and gasoline aboard for the eventful pioneer journey.

After circling forty-five minutes to gain a safer height where I hoped to find the currents steadier, I turned the plane toward the Atlantic. When nearing Culebra, the full force of the wind struck the planes first on one side and then on the other, buffeting us about like a rudderless boat upon an angry sea. At times the plane was swung nearly around on its course and at the same time "slump" downward several hundred feet before I could regain control of it. After about fifteen minutes of these twisters, we passed into a calmer strata, and I felt that if the plane had been equipped with anything less than the 80 H. P. motor, we would likely have lost the fight.

Working against the head winds beyond Culebra exhausted my supply of gasoline sooner than I expected, and just over Colon, at a height of 2,000 feet, the motor suddenly stopped and we made a very steep "volplane" to smooth water back of a pier at Cristobal. The surfage had some bad coral reefs, however, and one of them succeeded in puncturing the pontoon upon which the plane rested and it stopped hard and fast upon the reef.

Previous to the crossing of the Isthmus it was announced by someone high in authority that the United States had nothing to fear from the air fleets of a hostile nation doing damage to the Panama Canal works, as it was impossible for aeroplanes to make their way against the severe winds prevailing there.

To my mind, it would seem entirely feasible to do irreparable damage to a considerable part of the locks and equipment unless the military heads at once establish a large number of aeroplanes and capable men on the Canal Zone to thoroughly study and familiarize themselves with the peculiar conditions they will have to cope with.

Then, and then only, would there be a chance to guard this work constructed with so much pains, labor and expense for the express purpose of making the west coast more accessible for fleets of fighting vessels. It is to be hoped that steps will be taken in time to avoid any such dire consequences.

The above is a photograph of the hydro-aeroplane used by Robert G. Fowler in successfully crossing the Isthmus of Panama. Its power plant consisted of a 80 H. P. Hall-Scott motor.

LAW IN MASSACHUSETTS

See Editorial on Page 104, July Number of Aircraft, Relating to State Laws, by Denys P. Myers

Gov. Eugene N. Foss on May 17 signed a bill regulating the licensing and operation of aircraft in the commonwealth of Massachusetts. The new law is very different from the original bill introduced this year on the subject, two radical revisions having been given to its text. The bill was first introduced in the House and advocated before a committee by Harry N. Atwood, Earl Ovington and others. It was revised in the House and passed and on April 28 was reported out to the Senate in a new draft, which was passed and is now law. The final text is as follows:

AN ACT

To Regulate the Use of Air Craft.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

Section 1. It shall be unlawful for any aviator or other person to operate an aeroplane or air craft of any kind unless licensed so to do by the Massachusetts highway commission, except with a licensed pilot and then not for a distance exceeding five hundred miles. All licenses so granted shall expire on the last day of the year in which they are issued, and may be revoked at any time by the said commission. The license fee shall be five dollars; but no fee shall be charged for the issue of a new license to a person whose license is about to expire. No license shall be granted until the applicant has passed a satisfactory examination by the commission consisting of written replies to questions put to him by the commission, and of a flight to be made under the direction of an expert employed for the purpose by the commission. The questions put to the applicant shall include a test of his familiarity with such laws of the commonwealth as may be applicable to the operation of aircraft. No person shall receive a license as aforesaid until it is proved to the satisfaction of the commission that he has flown not less than one hundred miles in some standard type of machine.

Section 2. No aeroplane shall be used until it has been inspected by an inspector employed for the purpose by the said commission, and has been approved, registered, and had a register number assigned to it by the commission. The foregoing provision of this section shall not apply to aeroplanes used solely for the purpose of experimentation when used on or over grounds specially devoted to aviation, or an open body of water of sufficient size. The fee for registering each aeroplane shall be ten dollars. The registration number in numerals not less than two feet high shall be carried at all times when an aeroplane is away from its home station, and shall be so secured as to be visible from below. A registration number shall not be shifted from one aeroplane to another except in the case of aeroplanes controlled by manufacturers or dealers, in which case a special registration number shall cover any or all aeroplanes which may for the time being be controlled and operated by the said manufacturers or dealers.

Section 3. Aviators while flying over any part of the commonwealth of Massachusetts shall conform strictly to the following rules of the air:

a. Meeting head on: When two aeroplanes are in danger of meeting head on, each aviator shall change his course to the right.

b. Meeting obliquely:—When two aeroplanes threaten to meet at an angle, that aeroplane which has the other on its left shall have the right of way and shall continue its course with as little deviation as possible. The aviator who finds another aeroplane approaching him from the right shall change his course in order to avoid a collision. In changing his course the aviator may pass above, below, or on either side of the aeroplane having the right of way, but in any

case shall not pass within one hundred feet of the said aeroplane having the right of way.†

c. Overtaking:—One aeroplane shall be considered as overtaking another when it approaches the other from a position which is in any degree to the rear of the leading aeroplane, whether it approach from directly astern or obliquely from the right or left, downward or upward. An aviator overtaking another aeroplane must act on the assumption that the aviator ahead of him is ignorant of his approach, and may change the course of his aeroplane without warning. The overtaking aviator shall therefore be held solely responsible for avoiding a collision, which he may do by directing his course to the right or to the left, upward or downward. He shall so direct his course that the overtaking aeroplane shall not pass within one hundred and fifty feet of the overtaken aeroplane.

Section 4. No air machine shall fly over a city in the commonwealth at an altitude of less than three thousand feet, and no air machine shall fly over any town or village containing less than one thousand inhabitants except at an altitude of at least five hundred feet, and no air machine shall fly over any town or village in the commonwealth containing more than five thousand inhabitants excepting at an altitude of one thousand feet.

Section 5. No aviator shall fly over any massed assembly of one hundred or more people in the open whether such people be grouped in a grandstand or massed in an open field.

Section 6. When flying over buildings, persons or animals an aviator shall fly at such altitude as shall best conduce to the safety of those below him as well as to the safety of himself and his passengers, if he be carrying passengers. He shall be held liable for injuries resulting from his flying unless he can demonstrate that he had taken every reasonable precaution to prevent such injury.

Section 7. No aviator shall intentionally throw or drop any missile or other article from an aeroplane in flight except over grounds devoted to flying or over open water unless he has previously obtained the special permission of the commission.

Section 8. Except in cases of emergency an aviator shall not land in highways or public parks or other public grounds without permission from the authorities in charge thereof. In case an aviator should land in a highway, public park or other public ground without permission, the said highway commission may require him to prove that the landing was an emergency landing.

Section 9. The foregoing sections of this act shall not apply to military aviators while in the service of the commonwealth or of the United States.

Section 10. The said highway commission may permit any aviator or aeroplane which has been duly licensed or registered in another state to operate within this commonwealth for a period not exceeding ten consecutive days without requiring such aviator to obtain a Massachusetts license or to register his aeroplane.

Section 11. Any applicant for an aviator's license or for the registration of an aeroplane may appeal to the board of highway commissioners from any decision of an employee of the said board. In such case the applicant shall be entitled to a hearing before the board.

Section 12. Violation of any provision of this act shall be punished by a fine of not less than ten dollars nor more than five hundred dollars, or by imprisonment for not less than one month nor more than six months, or by both such fine and imprisonment.

*This method of passing being in accordance with the rules of the road on land and U. S. Steamboat regulations at sea.

†By giving the right of way to the aeroplane which has the other on its left hand this rule of the air is made to correspond with marine practice.

MODEL DEPARTMENT

By NICHOLAS S. SCHLOEDER

SCIENTIFIC MODELS.

Plans are now being completed for forming what is to be known as the Scientific Model Association, with headquarters at the World Building, New York City. The object of this society will be to further the interests of scientific models and model flying. It plans to hold its first contest on July 27.

Perhaps there is no one thing in model aeronautical circles that has given rise to so much discussion, ever since these activities began, than the relative merits of model flying as a science, and as a sport; and when it becomes either in a given set of circumstances. In clubs this has been a serious drawback, as it has tended to split the members into two groups. The one favoring the sporting aspect of model flying has nearly always been on the defensive.

The members of the scientific group are mostly drawn from those closely connected with full sized aeroplanes. They see no good in contests for distance and duration as they claim it leads to nowhere. The aviator accustomed as he is to view the Wright, Curtiss and other large aeroplanes, looks askance at the light model racer, differing entirely in design from the machines which he knows. He derisively terms these flying sticks, toys, good enough for the play of boys, but not worthy of the attention of anyone seriously interested in aeronautics.

These arguments, gaining weight, have in the past, led to the holding of certain contests, restricting the use of a model below a given weight, say 8 or 10 oz. Both in England and this country, we frequently hear of these "scientific" contests. But are these contests any more scientific than any other. It seems to us that they are not. Thus we find model flyers appearing on the field of competition, with a standard type, hopelessly overloaded with what might best be termed "junk," an absurdity from an engineering standpoint; a most unscientific affair indeed, for which the builder deserves nothing else than the credit for apparently having spent a great deal of time and labor on it. It is no wonder that the flights of these "scientific" models in most cases are little else than short hops. These models more frequently than not, are designed according to the racing model type, with propellers and main plane in the rear. The difference seems to consist in the number of useless pieces of bracing, guy wires and other things adding to the weight and resistance of the model, which are present. It is seldom that one finds a scale model which is accurate, especially in regard to distribution of weight; hence little is learned.

On the other hand, there is much to be said in favor of the light racer.

Perhaps the whole matter cannot be summed up than in a question once put the writer by a young model enthusiast, who in referring to distance and duration models said, "Why is it that they say these models are unscientific when they do the best work in the very thing that models are built for i. e. to fly! No, they are not unscientific. On the contrary, it is only because the fuselage has been constructed in the most scientific manner, care having been taken to put the bracing where it was needed; it is only because the wings are properly designed, neatly constructed, and resistance cut down wherever possible; because slow speed propellers are best, that the record holding models have been able to accomplish these results. A model must be most stable to circle about for more than two minutes, especially with the large wing surface of all good models to-day, a far more difficult feat with these low thrust *aeroplanes* than with many of the overpowered "scientific" *semi-helicopters.*

What is there of use in aeronautics that cannot be learned from models. It is the problem of engineering. The necessary size of the supporting beams of a 100 H. P. engine, and the proper way to attach the engine, the required strength of landing gear for a 1,000 lb., etc., all these very important things can never be learnt through models. This is not the less true because the model looks like its full size prototype. An experimenter may fly a model and find little or nothing of use to him, from an engineering standpoint, when he starts on a machine a thousand times as heavy.

It is in the great field of aerodynamics that the model flyer finds his efforts rewarded. Model aeroplanes afford an excellent opportunity for studying the distribution of weight in the Canard or loaded elevator type, for learning the difference between lifting and non-lifting tails in tractors, and other things pertaining to longitudinal stability. So too the effect of torque in single propeller machines, the action of dihedral angles, the use of vertical fins, flexible wings; all can be studied for the purpose of acquainting the aeronaut with the problems of lateral stability. Model flyers know the effect of pitch or thrust, and know how deceiving the standing thrust of a propeller is. In fact, the whole range of aviation can be most effectively studied through models. If many of our experimenters and inventors would take to model flying for some time and thereby learn the rudimentary principles of aerodynamics, the loss of much time and money, in many cases, might be averted.

While it is true models were brought to their present state by those who cared for little else than sport, yet the results arrived at by these empirical methods would probably be most useful to builders of large machines. The result has been most scientific, in spite of the method. Whether a person might derive any benefit from racing models, depends entirely on himself. If he chooses to make his work scientific, he will be amply rewarded for his efforts.

Undoubtedly a good many improvements can be made in the holding of contests. It is difficult to ascertain which model is the most scientific when a 2 oz. machine is pitted against a 6 oz. model. If the minimum weight of the aeroplane, exclusive of rubber would be placed at eight oz. and the maximum weight of rubber not to exceed 8 oz., then the model flying longest with the least amount of rubber would be most efficient. Thus a 12 oz. machine flying with 4 oz. of rubber would have to remain in the air but 2/3 of the time to equal a 16 oz. machine driven by 8 oz. of rubber in efficiency. It will be seen that such a contest would make the problem entirely aerodynamical, and not a test of the constructive skill of the designer in endeavoring to have an 8 oz. machine carry the greatest amount of rubber practicable.

There is no denying that much might be said in favor of models built to scale, provided that care is not only taken to have the dimensions of the wing surfaces, but also the center of gravity, as near as possible like the full sized machine. This is particularly true of model hydroaeroplanes.

Conditions more closely proximating those found in large machines cannot be created until some satisfactory substitute for rubber bands as motive power is found. A great many attempts have been made, but a thorough success has been made in no case. A satisfactory tiny gasoline engine is yet to appear. When this has taken place, real progress in model work will begin. Machines will then have about 6 ft. spread, and weigh a few pounds. Modellists will then be able to better study landing devices, etc.

For the present, whatever may be said in favor of scale or scientific models there is no doubt that the record duration and distance flyers are far from being unscientific, or even to be classed as nothing better than scientific toys, for there is much than can be learnt through them of great practical value, to all concerned in aeronautics in general. The aim of this new society should be not only to encourage the building of scientific models, but to point out to model flyers the scientific side of the ordinary duration or distance racer.

The top picture shows the team which represented the Bay Ridge Model Aero Club, winners of the Francis A. Collins Interclub Trophy. In the back row are: A. Heil and Walter Bamburger. E. H. Unkles, of the Aeronautical Bureau, measurer, and Louis Bamburger, comprise the front pair.

The lower picture is a photograph of Harry Herzog and his tractor hydro-aeroplane, which holds the world's record of 28 secs. for that type. Mr. Herzog, who is an experienced model flyer, made the best duration record—112 secs.—during the Interclub Meet, in addition to unofficially flying 2,803 feet. A description of his distance and duration model appeared in AIRCRAFT for May.

NEWS IN GENERAL

By D. E. BALL

Hempstead Plains

Considerable activity prevailed at the Hempstead Plains Aviation Field during the past month. All of the schools were running full blast and the exhibition flyers were kept busy coming and going continually. Almost any good morning between the hours of 4:30 and 8 o'clock there can be seen at the field anywhere from seven to ten machines in operation by the students of the various schools. In fact, the number of machines now being used at the field makes the run-away entirely too small for the purpose and AIRCRAFT suggests that the Hempstead Plains Aviation Field widen the course by cutting down the weeds and bushes for at least fifty feet on each side of the run-away. By doing so, this will not only save much time to the different students practising and permit them to secure more work during the practising hours, but it will also save much expense to the students in breakage and probably avoid some serious accident before the end of the season.

The above picture shows a class at the Moisant School of Aviation at Hempstead Plains Field, seated within the new club quarters. From left to right are: C. M. Wood, Kansas City; G. R. Pufiea, Chicago; Capt. Dante Nannini, Guatemala; S. Gordan, New York; S. S. Jerwan, Chief Pilot, New York; Mary Sims, New York; Wm. McGinn, Cincinnati; Harold Kantner, Meadville, Pa.; John McCue, New York.

MOISANT.

The Moisant students all did good work during the past month under the excellent instructorship of S. S. Jerwan and C. Murvin Wood.

G. R. Pufiea, who has been at the school for some time and is now able to use the 50 H. P. Gnôme Moisant monoplane, has been doing some exceptionally good flying and on July 17 easily won his pilot's license.

Mr. McGinn, who made a try for his pilot's license one day and failed to get it by reason of not landing close enough to the mark, recently left for his home in Cincinnati without it.

Dante Nannini, S. Gordon and Mrs. Mary Sims have all been making good straightaway flights lately, while John McCue did considerable grass cutting work and made a few short jumps during the month.

Harold Kantner can be seen out almost any evening between the hours of 4 and 7 o'clock flying the new Kantner-Moisant monoplane.

HILD.

F. C. Hild continues to fly his monoplane about the country whenever the weather is favorable. On June 24, he made a 20-mile cross-country flight over Mineola, Garden City, Hempstead and Hicksville. Mr. Alto L. Barnes, who was to have qualified for a pilot's license on July 4, made a bad landing with the school monoplane and as a result smashed a wing and part of the landing chassis. The machine was put into good condition a few days later, however, and activities resumed.

Mr. A. A. Gardner, of Fort Myers, Fla., who contracted with the Hild school about two months ago and who was forced to return home on account of business, will return to Hempstead on August 1 to resume his flying lessons.

SPAINOUR.

C. P. Prodger did some exceptionally good flying in the new Spainour monoplane before the machine was taken West for exhibition and demonstration work. This machine is notable for its lateral balancing system whereby the angle of incidence of the two wings are altered one up, the other down, instead of the usual twisting warping arrangement. The landing gear, which is also of original design, has provoked considerable favorable comment for, in spite of the fact that this machine has been built for over two years and has been handled mostly with underpowered motor and met with a number of bad landings and pancake falls, the chassis to-day is still intact and in its original state.

SHNEIDER.

F. P. Shneider is pushing along the construction of his new tractor biplane which should soon be ready for flight.

Joseph Richter has been away lately giving exhibition flying.

Lieut. Welham Wald, of Germany, who has been out every good morning, is about ready to take his license.

BOLAND.

During the month Horace Kemmerle, who is the champion joy rider of the aviation community, was out almost every morning and evening demonstrating the capabilities of the passenger carrying Boland tailless biplane. Among the passengers he carried were: Miss Joan Wabbett, Mrs. Sims, Messrs. Glenroy, Prodgers, Baysdorfer, Waters, Bonney, Steptoe and Beckwith, mostly students and pilots.

The passenger carrying Boland machine was transferred to Newark later and is now having pontoons attached to it for over water work. Charles V. Holflich will fly the new Boland machine which will shortly be at the field, and Jesse Waters, a mechanician, will learn to fly it.

SLOANE.

Almost every morning when the weather was good from three to eight students turned out for work at the Sloane School under the tutelage of Instructors Bonney, Gilpatric and Adams.

Miss M. Stahl has been doing good work during the month making straightaway flights, while LeRoy Allen and Hans Weideman were successful in making their first turns. Allen appears to be one of the most careful flyers among the students at the field, although Carl Kuhl, who has been making short hops, is also a very careful student. W. Lenke and James H. Clarke have given a good account of themselves during the grass cutting period and are about ready to take to the air, while P. W. Dunn, the last student to join the school, is progressing very nicely.

P. V. Martini had two smashes during the month and Hans Weideman, while attempting to make a turn in the air at a height of about 25 feet, while still climbing and with insufficient power, caused the machine to fall to the ground in a nasty smash-up. Weideman, however, escaped without a scratch, although he lost the seat of his trousers in the fall. After this accident the monoplane flyers were loud in their praise of the tractor type monoplane, claiming that had it been a machine either of the biplane or monoplane variety with the engine behind, the chances are that Weideman would have been crushed in the smash. On the other hand, the biplane adherents claimed that the accident would not have happened at all with a biplane because it is easier to handle and to make turns with and is less likely to side slip than a monoplane, and in addition it can be more quickly levelled out laterally before it has a chance to keel over and go into a nose dive.

Leonard Bonney, whose contract with the Sloane Company ended on July 8th, was, at the time of AIRCRAFT going to press, still uncertain as to his future movements.

BELLANCA.

Jose Bellanca can be seen on the field almost every morning with his little Demoiselle type monoplane doing speedy ground work. His assistant, Aristad Saragia, will shortly begin work as his pupil in practise.

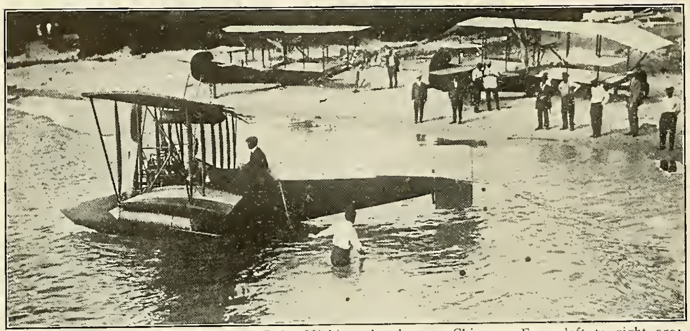
HEINRICH BROTHERS.

The neat little monoplane of the Heinrich Brothers can be seen on the field whenever it is possible for any flying to be done.

George A. Page, Jr., of Hillsdale, N. J., and Fred. Jacobs, of Boon, Germany, are two of the present students at the Heinrich school. Both Page and Jacobs have been making splendid straightaway flights and are about ready for their first turns.

The Heinrich Brothers expect to have another

Three views of the latest Benoist flying boat in action.



A group of flying boats on the Lake Michigan beach near Chicago. From left to right are: Roy Francis in the new Paterson tractor flying boat; J. B. R. Verplanck's Curtiss flying boat, and L. A. Vilas' Curtiss flying boat. The interesting features of the Paterson flying boat are the position of the pilot, who is placed high above the surface of the water, and also the twin tractor propellers, which are placed nearly in the centre between the two planes, thus bringing the centre of thrust more nearly in line with the centre of resistance than in the majority of flying boats. Verplanck's boat is the one which was recently piloted by Beckwith Havens on an over-water trip from Chicago to Detroit, while Vilas' Curtiss is the same boat which L. A. Vilas piloted across Lake Michigan from St. Joseph to Chicago.

machine on the field shortly, which machine will have one of the new Herbert-Evans motors installed in it. The Heinrich Brothers are also working on a new passenger carrying machine and also a new type single seater.

Arthur Heinrich, who is the last of the brothers to take up flying, is now making straight-away flights.

Mrs. Mary Simms has joined the school and is undergoing instruction.

Bath, N. Y.

Activities at the Thomas Aeroplane Factory and the Thomas Aviation School increases with each succeeding month. The Thomas Brothers recently built and delivered to Charles H. Herrmann, of Plattsburg, N. Y., a hydro-aeroplane with sheet metal pontoons and they are now building a duplicate of this machine for John H. Tweed, of Hartford, Conn. Mr. Tweed will shortly be trying this machine out upon the Lake.

The Thomas Brothers have also contracted with the Inter-Lake Yachting Association, of Cleveland, Ohio, to furnish one of their new flying boats and also one hydro-aeroplane for the Perry's Victory Centennial Celebration which will take place at Put-in-Bay, August 19-22.

Four of the Thomas aviators, Walter Johnson, Frank Burnside, Ralph Braun and Fred Eells, filled successfully Fourth of July engagements in various parts of the country.

The new Thomas flying boat piloted by Walter Johnson completed a series of tests at Conesus Lake before being shipped to Chicago.

Over fifty passengers were carried on one Sunday afternoon by Mr. Johnson in the new Thomas flying boat, among whom were: Mr. and Mrs. W. T. Thomas, C. M. Cox, S. H. Sharp, J. H. Tweed, Henry R. Seldon, R. W. Clark, U. S. N., Mr. Sickles, Jr., G. D. Wood, A. E. Thompson, F. F. Pulver, E. T. Dwyre, Miss Adelia A. R. Southard, Alfred W. Johnson, Miss Jennie Minges and others. Mr. Seldon, who is the son of the motorcar inventor said that his flying trip was a revelation to him and that he was particularly surprised at the great feeling of security he enjoyed throughout the trip and stated that as a sport flying is far superior to either automobiling or motorboating.

San Diego Notes

Despite the activity of the Curtiss Camp at Hammondsport, there are still a number of pupils making good progress at the San Diego camp. Things will be livened up there considerably now by the addition of the thirty officers and men ordered there from San Antonio.

John D. Cooper has gone East and is likely to handle one of the Curtiss flying boats in demonstration work. His place at the head of the San Diego school has been taken by Theo. C. MacCauley, who is an exceptionally good flier and a very competent instructor.

Most of the men now at this training school are ready to fly for their pilot licenses, and it is expected that at least six of them will qualify by the time this appears in print.

Curtiss Notes

Flying activity in the Curtiss Camp at Hammondsport still continues at a great pace in spite of the fact that a great many of the owners who were learning to operate flying boats last month, having finished their training had departed with their machines to various parts of the country, where they are continuing to spread the interest in this newest and greatest of all water sports.

School and practise work is, however, going on as busily as ever, but perhaps the greatest activity prevails in the factory which is working overtime on flying boat and aeroplane orders while the motor department is kept just as busy.

One of the latest recruits of the flying boat is William Thaw, of New York, who is undergoing training at the camp under Wildman. He seems to catch on to the flying idea very quickly and promises to become a good operator in a short time.

Lieuts. Smith and Bellinger were at Hammondsport recently doing some flying and superintending the installation of the Sperry Gyroscopic stabilizer on a naval flying boat.

Raymond V. Morris, William S. Lucky and Charles Niles were all in Canada over the Fourth flying in different cities. Elwood Doherty is a recent purchaser of a standard two-passenger flying boat.

Harry L. Jones, the parcel post aviator, is another who has purchased a Curtiss flying boat.

The Russian Government has also ordered three more water flying machines from Glenn H. Curtiss, which will make more than a dozen flying machines and a score of American aeronautical motors that this one European country alone has purchased and shows the favor with which the Curtiss craft is regarded abroad, not alone in Russia but in France, Germany, Austria, Italy and other countries.

Francis Wildman recently made a flight over Lake Keuka, N. Y., totaling six and a half hours and covering a distance of about 500 miles. Timed with a stop watch several times over a marked two-mile course, he made the distance in 1 min. 36 secs. He used a Curtiss Flying Boat, equipped with a 100 H. P. Curtiss motor.

Pennsylvania News

By W. H. Sheahan.

The balloon Philadelphia II. of the Philadelphia Aeronautical Recreation Society was badly torn while preparations for its second ascent of the season were being made June 9th.

The strong winds which swept the Point Breeze Field, where the balloon was being filled, lashed it from side to side and by contact with the ground caused a large rent in the envelope. The tear enlarged rapidly and the outpouring gas nearly overcame the close spectators that gathered to witness the flight. It became necessary to deflate the bag and ship it to New York for repairs. The postponed flight was made the latter part of June and lasted about an hour. Three passengers accompanied the pilot, Dr. Thomas Eldridge.

The League Island Navy Yard has been the field of greatest interest locally for the past month. Marshall Earl Reid and his latest type Curtiss flying boat have drawn large crowds. Flights and passenger carrying trips have been made daily. June 10th, Reid with J. Fred Betz as passenger, made an extended flight up the Delaware River and then down the same to Fort Mifflin and return to the Navy Yard. Capt. A. W. Grant, Commandant of the Navy Yard was also taken as a passenger down the river as far as Fort Mifflin and upon his return expressed his opinion that the boat was a great success and that he would soon fly again.

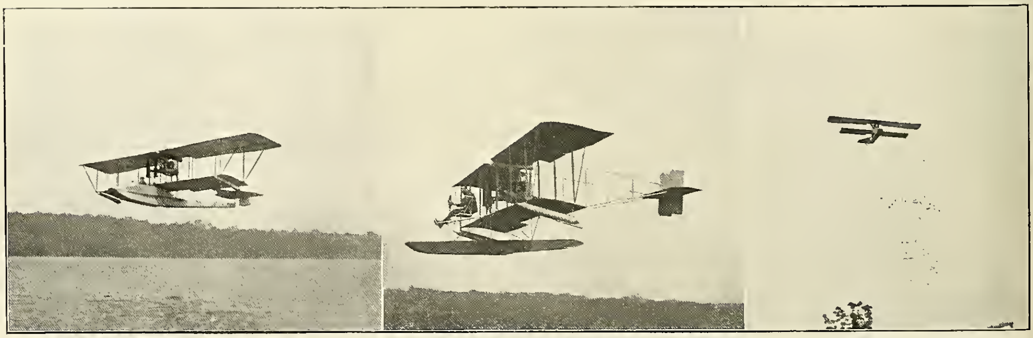
Reid has left Philadelphia for Wildwood, N. J., where under the auspices of the Aero Club of Penna. he will fly daily from the ocean. Aviator Reid and President Wynne of the Club spent some little time inspecting the various beaches along the coast and finally decided that the fine beach at Wildwood possessed many advantages owing to the absence of long piers and other obstructions.

W. C. Miller, of Irvin, Pa., has been doing considerable flying with a machine of his own construction.

The Aero Club of Penna. made its third balloon ascension of the season from its grounds at Holmesburg, June 21st. The balloon Philadelphia Pennsylvania I. ascended from the Holmesburg Field about one o'clock in the afternoon carrying Pilot Atherholt and two passengers. A landing was made early the same evening near Lakewood, N. J. Shortly afterward a heavy electrical storm burst which was fortunately avoided by the early landing.

O. E. Williams, with his Curtiss type plane is flying daily at Wyoming, Pa.

Earle Fuller, has finished the building of his Curtiss type machine at the Bergdoll hangar, Eagle Aviation Field, and has made several trials of same. A few weeks ago while making a land-



The first and third pictures in this group show the latest Thomas flying boat piloted by Fred Eells, while the centre picture is the Thomas Brothers' newest design in hydro-aeroplanes. This hydro-aeroplane was recently sold to Charles Herrmann and a similar one to J. H. Tweed, of Hartford, Conn.

ing he was unable to short circuit his engine and ran into a fence smashing his front elevator. Fuller escaped with but slight injuries and will soon have his machine in trim for future work.

Percy Pierce, formerly of New York, and at one time the most prominent model builder in the East, had a tumble from a glider which he had built and was testing at the Aromink Golf Club grounds, near Philadelphia, June 27th. Pierce was only slightly injured. Several successful flights were made the day previous to the accident.

During the Mardi Gras celebration at Easton, during the latter part of June, Miss Ruth Law made successful flights with her Wright biplane.

Aviator Richter, while flying at Ridgway, July 4th was forced to glide from an elevation of several hundred feet, due to engine trouble. Striking a tree his machine was badly wrecked but Richter escaped with but minor injuries. It is reported that the souvenir hunters carried away nearly all the loose parts of the wrecked plane.

Exposed and Insecure Position of Pilot and Passenger Causes Accident to Lieuts. Billingsley and Towers

On June 21 while flying at Annapolis, Ensign W. D. Billingsley, the Navy Pilot, was thrown from his hydro-aeroplane from a height of 1,600 feet and was drowned. Lieut. Towers, the Navy's chief aviator, who was flying with Billingsley at the time as passenger saved himself by clinging to the machine as it fell. The accident took place in a B-2 Navy Wright Biplane which had been fitted with floats. The machine was flying at a considerable altitude when a sudden gust of wind hit the tail and pitched the machine sharply forward, thereby throwing Lieut. Billingsley, who was a heavy man, sharply forward and causing him to inadvertently push his elevator controls down which still more aggravated the dive and stood the machine on its head, thus pitching the unfortunate pilot out of the machine.

This accident is another example of the folly of placing the pilot and passenger of an aeroplane in an exposed and insecure position where in the event of a bad dive they have no chance of holding themselves in their seats. In the present instance this was especially true for with the type of machine that Lieuts. Billingsley and Towers were flying there was nothing, with the exception of a small foot rest, to hold the occupants in and this is hardly sufficient even under favorable conditions. In discussing the accident with Bob Fowler, the transcontinental flyer, he told the writer that on several occasions when flying a similar type of machine, he had been repeatedly lifted a foot out of his seat and was only able to retain control with great difficulty. The fact of Lieut. Towers being able to save his life by clinging to the machine emphasizes the importance of the occupants being so placed in an aeroplane that they cannot fall out, for there is always the chance of the machine temporarily righting itself or at least checking the fall or of the pilot's being able to partially get control of it again.

U. S. Army Aviation Notes

San Diego.

During the first week in June there were 32 flights made by the two student officers, Lieuts. Taliaferro and Carberry.

The total time in the air for these flights was 2 hours and 35 minutes.

These officers are making rapid progress and will undoubtedly qualify for their F. A. I. licenses in a very short time.

Texas City.

During the week ending June 7, all the officers present made a number of flights. Lieut. Milling headed the list with a total of 10 flights and a total time in the air of 1 hour and 35 minutes. He gave instruction to Lieuts. Dodd, Kelly and Call

Lieut. Ellington made eight flights with a total time of 2 hours and 35 minutes.

Lieut. Kirtland gave instructions to Lieuts. Love, Dodd and Morrow, making a total of 6 flights.

Capt. Hennessey who has just recently learned the Wright control had a total of 5 flights for 1 hour and 13 minutes.

Lieut. Call made the longest flight of the week, remaining in the air for one hour and 13 minutes.

The detachment started for San Diego on June 14, where a large school is to be established. This school will be for the instruction of officers just detailed on aviation duty. After learning to fly and receiving their Military Aviator's license they will report to the Aviation Centers.

Lieuts. Graham, Kirtland and Call have been left with three aeroplanes, for duty with the Division at Texas City.

Philippine Islands.

During the period from March 24 to April 30, 1913, the training machine was in the air for a total time of 23 hours. Lieut. Lahm who was instructor spent 11 hours and 17 minutes in the air with Lieuts. Chapman, Dargue and Rich as pupils. All of these officers took their first flight alone on April 14, 1913. Between that date and April 30, they spent the following time in the air:

Lieut. Chapman................41 mins.
Lieut. Dargue.........5 hours, 59 mins.
Lieut. Rich.........4 hours, 39 minutes

These officers flew every day during the time specified above, except Sundays.

U. S. Army and Navy Aeroplanes

The U. S. Army now has 19 aeroplanes consisting of the following makes: 9 Wright land machines, 4 Curtiss land machines and 1 Flying boat, 4 Burgess land machines and 1 hydro-aeroplane.

The U. S. Navy is now the possessor of eight aeroplanes of the following types: 2 Curtiss flying boats, 3 Curtiss hydro-aeroplanes, 2 Wright hydro-aeroplanes and 1 Burgess flying boat.

The original Wright biplane purchased for the Army is now in possession of the Smithsonian Institution. Altogether this makes 28 aeroplanes the United States government has purchased so far, or about one-third the number purchased by Bulgaria and about one-half the number purchased by the "sick man of Europe"—Turkey.

Vilas in His Curtiss Flying Boat Takes Oscar Straus and Others for Flights in the Vicinity of New York

On June 23rd and 24th, L. A. Vilas, the young Chicago sportsman, gave a series of demonstrations and passenger flights at the Westchester Country Club, Pelham Bay, N. Y., in his beautifully finished Curtiss flying boat.

One of the first passengers to be carried was Oscar Straus, who enjoyed a spin both over the water and through the air. Upon landing Mr. Straus declared himself as delighted with the experience. Even before the boat had touched shore he was waving his hand and shouting "Wonderful! Absolutely wonderful. Too fine to express in words." "It is undoubtedly the sport of the future," Mr. Straus continued, "I cannot tell you how secure I felt all the time we were out."

Other passengers who were also taken for enjoyable trips were: Miss Consuelo Bailey, of Bay Shore, L. I.; Miss Ruth Thompson, of Natchez, Miss.; Mrs. Codington, Miss Carrie Hatch, Miss Grace Egbert and Proprietor Muschinheim, of the Hotel Astor, New York City.

Vilas in Curtiss Flying Boat Flies Across Lake Michigan

On July 1, L. A. Vilas accompanied by William Baster as passenger, made the first flight across Lake Michigan ever accomplished, flying his Curtiss flying boat from St. Joseph, Mich., to Chicago, a distance of 56½ miles in 1 hour and 16 mins.

The flight was made in a strong wind and without a compass so the actual distance flown was about 70 miles. Vilas maintained an average height of about 2,500 feet and encountered varying winds. Only two boats were sighted throughout the trip but Vilas was not worrying as he felt perfectly confident about both the air and seaworthiness of his Curtiss craft.

Lieutenant Arnold Awarded Mackay Trophy

The Clarence Mackay trophy, a large silver cup, for cross country flying, was presented on the evening of June 23rd at the Army and Navy Club to First Lieutenant Henry A. Arnold, U. S. A., an army aviator. The presentation was made by Brigadier General James Allen, U. S. A., retired, formerly chief signal officer of the army. The conditions under which the trophy was awarded were that the successful competitor make a cross-country flight of not less than ten miles at an altitude not less than 1,500 feet.

Lieutenant Arnold won the trophy at College Park, Md., last spring. His only opponent was Second Lieutenant Thomas De W. Milling, U. S. A. Within fifteen minutes after the start Lieutenant Milling had an attack of air sickness and had to retire. Lieutenant Arnold flew across the Potomac River into Virginia and picked out a detachment of cavalry sent out from Fort Meyer, Va. Upon his return to the aviation field at College Park he made a report of his observation and located the "hostile" detachment on a map.

The Moisant Company recently gave a private exhibition for the benefit of Dr. Muro Muller, Foreign Minister of Brazil, and the officers of the Brazilian warship. The machine here shown is the new Kantner monoplane. The man to the extreme left with his back to the camera is Mr. Charles de Peloggio, the general manager of the Moisant Aviation Company, and it is through Mr. Peloggio's untiring efforts that the Moisant Company has been meeting with such good success lately.

Photograph of Mrs. Mary Simms, who is taking up a course of aviation at the Heinrich School and who is now making very good straightaway flights.

Great Lakes Cruise

At noon on Tuesday, July 8, Beckwith Havens, in J. B. R. Verplanck's Curtiss flying boat, with Mr. Verplanck as passenger, and Anthony Jannus, in a Benoist flying boat, accompanied by Paul McCullough as passenger, were the only starters. About three hours afterwards, however, Walter Johnson, in a Thomas flying boat, made a getaway, but owing to a heavy northeast wind which turned into a storm after the boats had gotten started, Johnson was forced to land at Robertsdale, Ind., and as the lake did not quiet down until the next day, and even then heavy swells and breakers kept rolling in on the Robertsdale beach, making a heavy sea, the Thomas Brothers thought it was best to withdraw from the cruise.

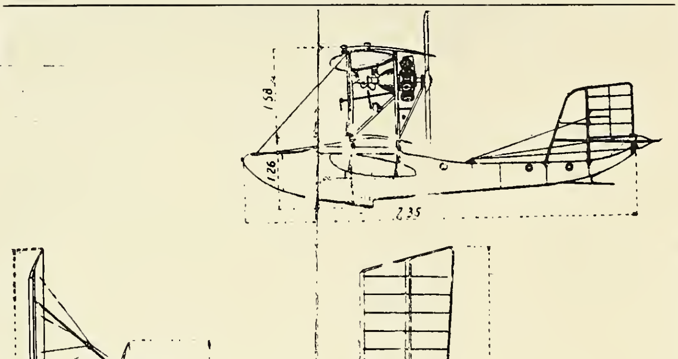
Beckwith Havens reached Michigan City safely after a splendid flight of 56 minutes. Jannus, however, was caught in the storm and his boat was lost and Jannus was brought to shore on a sand barge.

On Wednesday, July 9, Roy I. Francis, in a Paterson flying boat, started in the race and flew as far as South Haven, Mich., where he landed with a broken propeller, while Havens went from Michigan City to Macatawa Park, Mich.

On July 11 Glenn L. Martin, with Charles Day as passenger, left Chicago at 7.50 a. m. in his new aero-yacht, and after a splendid run of 162 miles he arrived at Lake Harbor, near Muskegon, whereas both Havens and Francis wound up for the night at Pentwater, 236 miles from Chicago.

On July 14 Havens and Verplanck reached Charlevoix, Mich.

On July 15 the report was broadcast that the cruise had been called off and that Martin and Francis therefore refused to go any further. Havens, however, continued on the course to the finish—Detroit, Mich.—where he arrived in good shape on Friday, July 18, completing the most remarkable trip ever undertaken by flying boat, the distance being approximately 900 miles.



Scale drawings of the new Leveque airboat.

Western Aviation Notes

By E. R. Cary.

W. A. Kapseker, of Topeka, Kans., has built a splendid Curtiss type machine which is equipped with Greer stabilizer.

E. C. Russell, of Wheatland, Wyo., an ex-parachute jumper, has two machines under construction, a monoplane and a biplane of original type.

McCallam, of Kansas City, has joined the Young Aviation Company, a concern in the exhibition business and constructors of three types of planes.

A company is being floated at Cripple Creek, Colo., by Mr. Cooper, to handle the construction of a dirigible embodying many excellent features.

Young Jack Shepherd, of Pueblo, Colo., has an excellent Wright copy, which is understood to be controlled by electricity—Ruthenberger motor.

The two Firth boys have built an excellent Wright type machine, which is awaiting installment of motor.

During the winter months the Witzig brothers rebuilt their Benoist with much success and also started the construction of a tractor.

Dr. W. H. Easter, of Boulder, Colo., a licensed pilot, has been making several short flights recently with a machine of his own design.

Mr. Clint Otis Dumm, also of Boulder, Colo., has designed a streamline monoplane and hopes to start construction of same in the near future.

Francis A. Collins Interclub Result

The final contest for the F. A. Collins interclub trophy, for duration from the hand, was held on Sunday, June 15. The Long Island M. A. C. was the winner, securing the 20 points with a team average of 78 1/5 seconds. The Bayridge M. A. C. was right behind with an average of 78 1/3 seconds. The victory of the first named club did not prevent the Bayridge Model Aero Club from winning the first interclub contest ever held in this country, with the grand total of 94.42 points in the five contests. The contest was extremely close as was shown by the records which follow:

Bayridge Club	94.42 points
Long Island Club	93.08 points
N. Y. M. A. C.	22.01 points
Summit Club	12.5 points

The competition brought out some excellent flying, four new world's records being made. It is hoped that now that this type of contest has been inaugurated, the ball will be kept rolling by other model groups in this country.

Peoli Flies in Gale in Canada

On June 30th and July 1st, Cecil Peoli, the young Baldwin pilot, in his 80 H. P. Hall-Scott Baldwin biplane flew at Barry, Ontario. The grounds were so small and the obstructions so many that it was only by making use of a 30 mile an hour ground wind that he was enabled to clear the trees surrounding the field and as soon as he got up a couple of thousand feet the wind became so strong that his machine which makes 65 miles an hour began to get blown backward. It was only by diving down with the power on that he was enabled to reach the field. His flights on both days had to be made in the early part of the afternoon when the wind was strong, because as soon as the winds died down a bit it was impossible to get up out of the field.

On July 4th he flew at Lanark, Canada, and here the grounds were even smaller and it was only by taking advantage of a high wind preceding a thunderstorm that he was enabled to rise out of the field at all. During this flight he had the exciting experience of watching the storm approaching and waiting until it was almost on top of him before he made a quick dive into the field. After the storm had passed over a dead calm prevailed but in spite of the ideal flying weather which it left, he was unable to fly again as it was impossible to clear the trees. In making his flight before the storm, however, he had succeeded in fulfilling his contract.

NATIONAL BALLOON RACE

JULY 4th, 1913

Balloon	Pilots	Aides	Time of Start	Starting Place	Landed	Time of Landing	Dist. (Miles)
Kansas City II	John Watts	Geo. Quisenberry		Kansas City, Mo.	Goodrich, Mich.	2:00 P.M. July 5th	638
Goodyear	R. H. Upson	R. A. D. Preston	7:21 P.M.	Kansas City, Mo.	7 miles east of W. Branch, Mich.	3:17 P.M. July 5th	647½
Kansas City Post	H. E. Honeywell	Ward C. Gifford	7:33 P.M.	Kansas City, Mo.	2½ miles east of Rockwood, Mich.	2:46 P.M. July 5th	642
Million Population Club	Capt. John Berry	A. Von Hoffman, Aide; A. Von Hoffman, Jr., Second Aide	6:25 P.M.	Kansas City, Mo.	6 miles N. E. of Manchester, Mich	1:00 P.M. July 5th	590

THE MARTIN HYDRO-AEROPLANE

Glenn L. Martin, the California builder and designer of aircraft, has recently brought out a new hydro-aeroplane which has many novel features.

The Martin "aero yacht" as he calls it is a comfortable four-passenger convertible tractor in which the pilot occupies the rear seat. Both seats are of the "surrey" type, each being forty-eight inches in width. The body of the machine is twenty-five feet in length, and is oval in shape, presenting very little head resistance. The supporting surfaces have a spread of thirty-five feet, the span between the struts being seven feet. The wings have a chord of five feet, two inches, with three and one-half inch camber, the planes being five and one-half feet apart.

The wing section is built up, and has solid ribs, nine inches apart, with short ribs over the nose, three inches apart. This construction makes a very efficient wing, and holds the cloth to the designed curve. The front beam is an "I" section, two and one-quarter inches by one and one-half inches. The rear beam is one and three-eighths inches by two inches.

The pontoon carriage is seventeen feet in length, with a displacement of three thousand pounds, and can be detached from the machine and replaced with a strong landing gear in thirty minutes. The landing gear is of the two wheeled, rubber spring type, with a central skid, similar to the landing gear on the Day tractor, which has proven so efficient during the last year.

The pontoon is built up of Spanish cedar planking, eight inches in width, with forty sets of rib bracing for a carcass. It is divided into eight water tight compartments, which insures its floating in case of severe jams in the water. The entire structure is covered with cloth and glue, being finished with three coats of varnish.

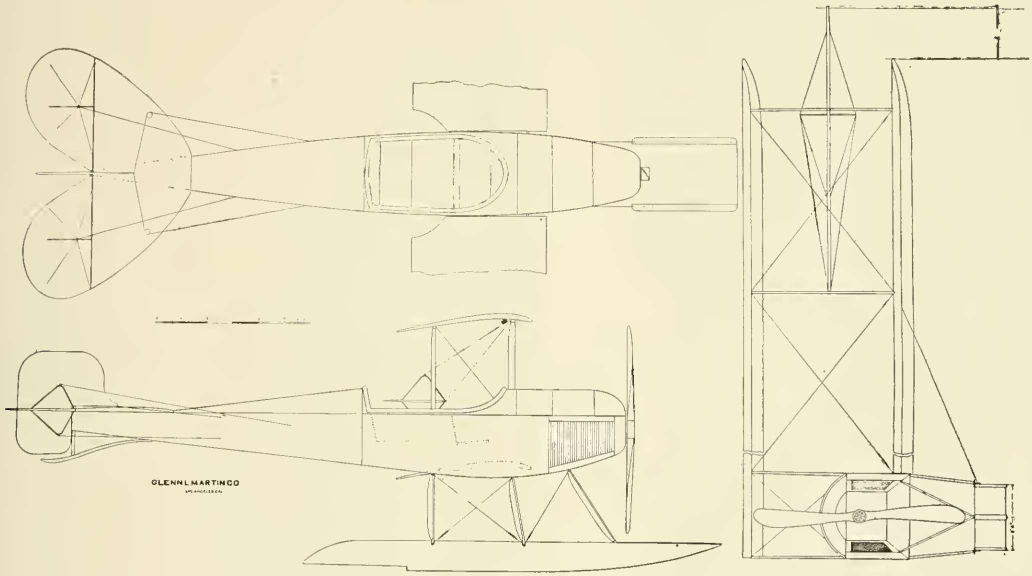
The built-up vaning surface of the tail is unusually strong requiring no wire bracing to keep it in shape. The tail flaps, rudder, and ailerons are also constructed in such a manner as to require practically no wire bracing, and their generous proportions make the machine a powerful flyer.

The wing tip, or outrigging pontoons are of the same mechanical construction as the main pontoon, but are of a very unique design, being so built that at sixty miles an hour they support their own weight, and at the same time offer practically no head resistance. While on the water they are at a planing angle. They have a displacement of two hundred and twenty-five pounds each.

The motor, an eighty horse-power Curtiss, is mounted in the forward part of the body, ahead of the passengers and pilot, and is cooled by two very efficient, specially built Hall-Scott radiators placed in the sides of the body. The motor is equipped with a muffler of Mr. Martin's design, which effectively silences the exhaust, without creating back pressure, and thereby causing a loss of power. The motor is enclosed under a detachable aluminum hood, rendering it easily accessible for the cleaning of spark plugs, and other necessary adjustments.

Patents have been applied for on the unusually efficient and simple manner in which the fuselage is put together, the metal fittings being so constructed that it is unnecessary to drill a single hole through the longitudinal members of the body. The same general principle is used in the fittings of the wings, for connecting the struts and wire to the wing sections. This feature is a valuable time saver in setting up and knocking down the machine.

These metal fittings are the design of Charles H. Day, superintendent of the Los Angeles factory of the Glenn L. Martin Company.



Scale drawings of the new Glenn L. Martin "Aero-Yacht"

CORRESPONDENCE

Ghoulish Newspaper Editors

Brooklyn, N. Y., June 27, 1913.

Editor Aircraft.

"London, June 24.—The story of the drowning of an aviator named C. B. Fairbairns is a hoax. The newspapers reported last night that he was killed in a sensational manner off Shoeburyness, after making a flight from the Brooklands Aerodrome, in which he experimented with a new type of machine, with which he purposed to make a transatlantic flight in July. He was said to have fallen into the sea from a height of 1,000 feet and to have sunk before a friend cruising in the vicinity was able to rescue him. His machine, reported to be of 350 horse power, was said to be completely inclosed and provided with a glass conning tower."

To the above clipping from the New York Times of Wednesday I respectfully invite your special attention. Is it possible that the newspapers and press associations are in league to discredit the aeroplane? For some time, in fact ever since the aeroplane began to lose something of its novelty, I have noticed a steadily growing tendency on the part of the press to exaggerate and enlarge upon aviation accidents to an almost ridiculous degree and to accord fatalities altogether unwarrantable publicity at the same time ignoring the repeated demonstrations of the utility of the heavier-than-air craft.

Be he amateur or of the circus variety of professional, civilian or military, brilliant or of the shallow brained type which is ever ready to attempt flight in any crude contraption, no fatal accident to an aviator in any part of the world occurs but that it is not immediately reported from ocean to ocean. Now these newsmongers, thirsty for the blood of airmen, not satisfied with the present death rate (which is, as you know, really decreasing in proportion to the number of persons flying), have apparently resorted to manufacturing air-tragedies. Did you notice under what ultra sensational conditions the mythical Fairbairns was alleged to have lost his life? One, paper had it he fell 3,000 feet to his death!

If you happen to know anything concerning the future attitude of the press toward aviation, I wish you would tell Aircraft's readers about it. Often I ponder, is it any wonder that we find the public apathetic or even hostile when it comes to the subject of aviation? Fed by heavy leaded, highly colored, sensational descriptions of accidents, given false ideas as to their causes and denied the merest inkling as to the excellent every day performances of aircraft is it surprising that the man whose choice of reading matter rarely includes little more than the cheap news sheet is prejudiced against the aeroplane and believes it little more than a death dealing instrument? What incentive has the Associated Press anyway to continue with such fervent zeal the task of recording the deaths of victims of aviation accidents the world over? No less an authority than Orville Wright had this to say on the subject not long ago:

"The apparent stagnation in aviation in the United States is due, if you want me to speak plainly, to the American newspapers. The newspapers play up every accident that occurs in aviation, and minimize the actual results in flying. The public from the stories printed in the newspapers, has an idea that the average flight ends in a fatal accident, whereas there is only a small percentage of accidents."

You have written editorially on the subject ere this, I know. Will you please continue to exhort the readers of "Aircraft" to help in some sort of plan to disseminate the real truth about fatalities in aviation, their causes and their infrequency in proportion to the number of persons in nearly every civilized country daily engaged in flying in the interests of the sport, the science and the industry?

Yours very truly,
F. V. ROLLOW,
A constant reader of Aircraft.

Some Willoughby Ideas.

There seems to be a general popular belief, that the single hulled "flying-boat" is a more seaworthy hydro-aeroplane than the double-hulled "flying-boat" and I notice that in the Great Lakes Reliability Cruise, Mr. E. Percy Noel, in giving his cup for a race this Summer, has excluded the double hulls, evidently with the idea that the single hulled craft was by far the most reliable to cruise with under all conditions.

Several years ago I built and sailed catamarans at the time that Herreshoff built and raced his wonderful production the catamaran "Tarantula," winning races from the fastest sandbag jib-and-mainsail boats in New York Bay. A few years later, I built and experimented with the flying "Proa" of the Ladrone Islanders. This is also a double-hulled boat, one hull being very much larger than the other. I made an improvement in the way the natives handle this craft by putting a rudder at each end. The flying proas do not tack, but "ware-ship," the bow becoming the stern, and the native carries his big steering oar the entire length of the deck. I got very tired of this system, and put rudders at each end of *my* proa. It was partly from these rudders (steering in the horizontal plane) and partly from the air tactics of the bird—pelican—as he steered in the vertical plane that gave me the idea of my "Patent Double Rudders."

When the United States Naval War Vessel "Huron" was wrecked, Lieut. Lucien Young carried a line to the shore with a small catamaran that was lashed on deck, after every boat on the ship had been smashed in an attempt to get them launched. Four years ago a lifeguard on the Jersey Coast was saving people from the surf, in a rowing catamaran, which he found did much better work than the surf boats. While cruising on the Indian River, Florida, Winter before last, with the "Pelican II.", I picked up several points, in handling her under conditions of high winds, with disabled engine. In surface running with moderate winds on the beam, and engine stopped, your "hydro" always swings around like a weather-vane, head to the wind; now the double hulls, as they swing, give good side support, being separated eight feet apart, which the single-hull does not. a fatal mistake, in copying the stern lines of other Stern way then begins, and the harder it blows, the higher the speed astern. I found I had made hydroaeroplanes, and once I came near having a bad wreck, as both hulls dove to the bottom, stern foremost. It was fortunate that the water was but four feet deep. In the "Pelican III." the stern of the float is a duplicate of the bow and it rises as the speed astern increases.

You cannot anchor a hydroaeroplane in a stiff wind, and high sea, by the head. Your anchor must be astern. What will a single-hulled "Hydro" do, with her delicate after construction especially if her vertical rudder sticks down into the water, if she anchor under these conditions. The "Pelican Nurse" that I built three years ago, was a "catamaran-motor-boat" with a thirty horse power automobile engine. She gave a very good account of herself, both as to speed, and sea-going qualities. The Curtiss "single-hull" has about nine inches of available freeboard, while the double-hulled "hydros," using the nacelle as a place to sit and keep dry in, have four feet, or about the same freeboard as the cruising motor boats that race to Bermuda.

(Signed) HUGH L. WILLOUGHBY.

Captain Worden's Good Work

Mr. A. W. Lawson,
Editor AIRCRAFT.

Dear Sir: Following your suggestion of some time ago that we all put our shoulder to the wheel and push for the upbuilding of the Army and Navy aviation equipment, I evolved the following plan and put it into operation at once.

After each successfully completed exhibition the public are always very enthusiastic and the aviator will experience little or no difficulty in having influential signatures placed upon a previously prepared letter similar to the enclosure, or a direct letter written by the Board of Trade, etc.

I have outlined my plan to Army officers and political men and it is their unanimous opinion that these letters are such a direct personal appeal from their own supporters that the Congressman or Senator so addressed is personally obligated in a manner he cannot evade, and far more so than he would be from any appeal not signed by his own constituents.

I have recently flown in Belton, Georgetown, Yoakum, Lockhart, Taylor and Brenham, all in this state, and have had these letters addressed to two Senators and three Congressmen. I am booked here in Houston for the last of this week, and will secure another letter here.

If through your publication you can induce all the other exhibition fliers to follow my lead, I believe before the season is over every Congressman and every Senator will have been approached, and results could then be looked for.

Thanking you for past favors, and assuring you of my co-operation in any movement for the promotion of aviation, I am,

Yours very truly,
CAPT. J. H. WORDEN.

DESCRIPTION OF THE KANTNER-MOISANT MONOPLANE

By WALTER H. PHIPPS

Without doubt one of the finest monoplanes ever turned out in this country and one that both from the standpoints of design and construction is worthy to rank foremost amongst the leading monoplanes of the world, is the new Kantner-Moisant monoplane built by the Moisant Company.

Mr. Harold Kantner, the designer and pilot, is one of the few aviators who possesses a good technical knowledge of aviation and one of the very few pilots who is not content to leave the construction and inspection of machines to others, but insists on superintending these things himself, which accounts for the fact that the machines that Mr. Kantner flies are always in first-class condition, and probably explains his freedom from accidents.

In view of these facts, it is not surprising that the new Kantner monoplane has proved such a successful flier, and there is no reason to doubt that, were it fitted with an 80 H. P. motor, it would hold its own with the best of the foreign makes.

Genealogically the Kantner monoplane may be said to be a descendant from the Blériot and Morane-Saulnier monoplanes, but this is only the case in regard to general outline, for, as the accompanying drawings will show, the machine is really an original and distinct design, every bit as much as the Morane-Saulnier is a distinct design from the Blériot and the Borel a distinct design from the Deperdussin, although they can all be said to resemble one another in general form and principle, for do they not all have a central fuselage or body carrying in the front the motor and propeller, with the wings just behind and the tail and rudders at the rear?

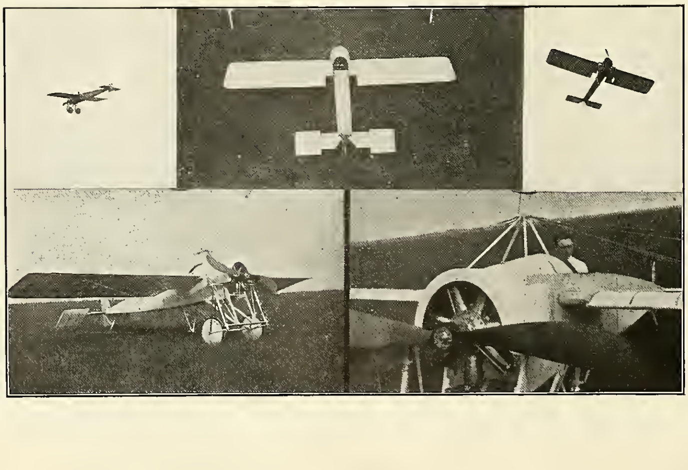
One of the features of the design of this monoplane and something that characterizes it as an American machine, is the fact that all dimensions have been worked out evenly in feet and inches, and every strut and spar has been spaced at uniform intervals as far as possible. Thus we find in the fuselage the struts from the back of the body being placed exactly at two feet intervals, with the ribs in the planes spaced exactly one foot apart, and so on. The main dimensions run in even feet, the fuselage itself measuring exactly 17 feet, while the total overall length is exactly 21 feet, and the span works out to exactly 30 feet.

Turning now to a description of the machine itself, we will first begin by describing the fuselage.

FUSELAGE.

This is of the covered in type and somewhat resembles the Morane-Saulnier, having the sides running almost parallel right back to the elevator, with the top and bottom tapering to a flat stern. In side elevation the area decreases rapidly from the wings to the tail, so that for a greater portion of the distance aft the side area is comparatively small, the idea of this being apparently to overcome the trouble which machines of the Nieuport and similar types are said to be liable, i. e., that if a machine is overbanked instead of side slipping bodily the big side area aft holds the tail up so that the machine immediately goes into a side and nose dive. The Kantner fuselage differs from the Morane-Saulnier in that the top and bottom longitudinals are perfectly parallel at the front and do not curve downwards and upwards as on the French machine. The fuselage itself, which is built up in the usual manner, measures exactly 17 feet in length and is split in the middle to facilitate transport, although it is seldom necessary to take it apart, as the whole machine has been so designed that with the wings off it can go into an ordinary side-door express car.

The pilot's cockpit, which is situated well forward, is very roomy and the pilot is effectively shielded from both wind and oil by the sloping dash and efficient oil shield, which does not allow for so much as a drop reaching the aviator.



THE MAIN PLANES.

The main planes are of somewhat unusual monoplane design, in that they have straight ends instead of the usual curved wing tips used on most monoplanes. They are of exceptionally strong construction and each measures exactly 14 feet long, with a chord of 6 feet at the body, which tapers to 5 feet 9 inches at the ends. The ribs are spaced 1 foot apart, thus simplifying construction. The main spars are of large size and are greatly strengthened by the addition of extra wood and steel clamps at the points of attachment of the wing guys, of which there are eight to each wing. One of the chief features of the Kantner monoplane and one that especially recommends it for military work, is the case and rapidity with which the wings can be taken off. The top wing wires run to a single plate bolted on the top of the upper pylon, and when this bolt is unfastened it slackens off the top wires and permits of the wings being speedily detached from the machine by simply pulling out each wire from its special groove fitting. Each lower wing wire is fitted with a special hook fitting, which slides into a groove at the point of attachment and is held in place by the pull on the wire and also by a safety lock spring.

THE TAIL.

The tail is of the balanced elevator type similar to the old style Blériot, but with the important difference that it is practically flat top and bottom and is not set at a lifting angle. The whole tail is built up as a unit, the centre stationary section being braced with a box girder construction which stiffens the whole tail and acts as a guide and bearing for the tube which runs through it to carry the elevators. In addition this tube is stuffed with wood so that the whole structure is exceptionally rigid and there is no need for any external bracing, in fact the whole tail is clamped to the end of the fuselage by two large U bolts.

The rudder is mounted above and below the tail, but is braced to the fuselage itself. It is braced below by a sort of steel tube pylon, which in addition serves as an anchorage for the tail skid.

THE LANDING CHASSIS.

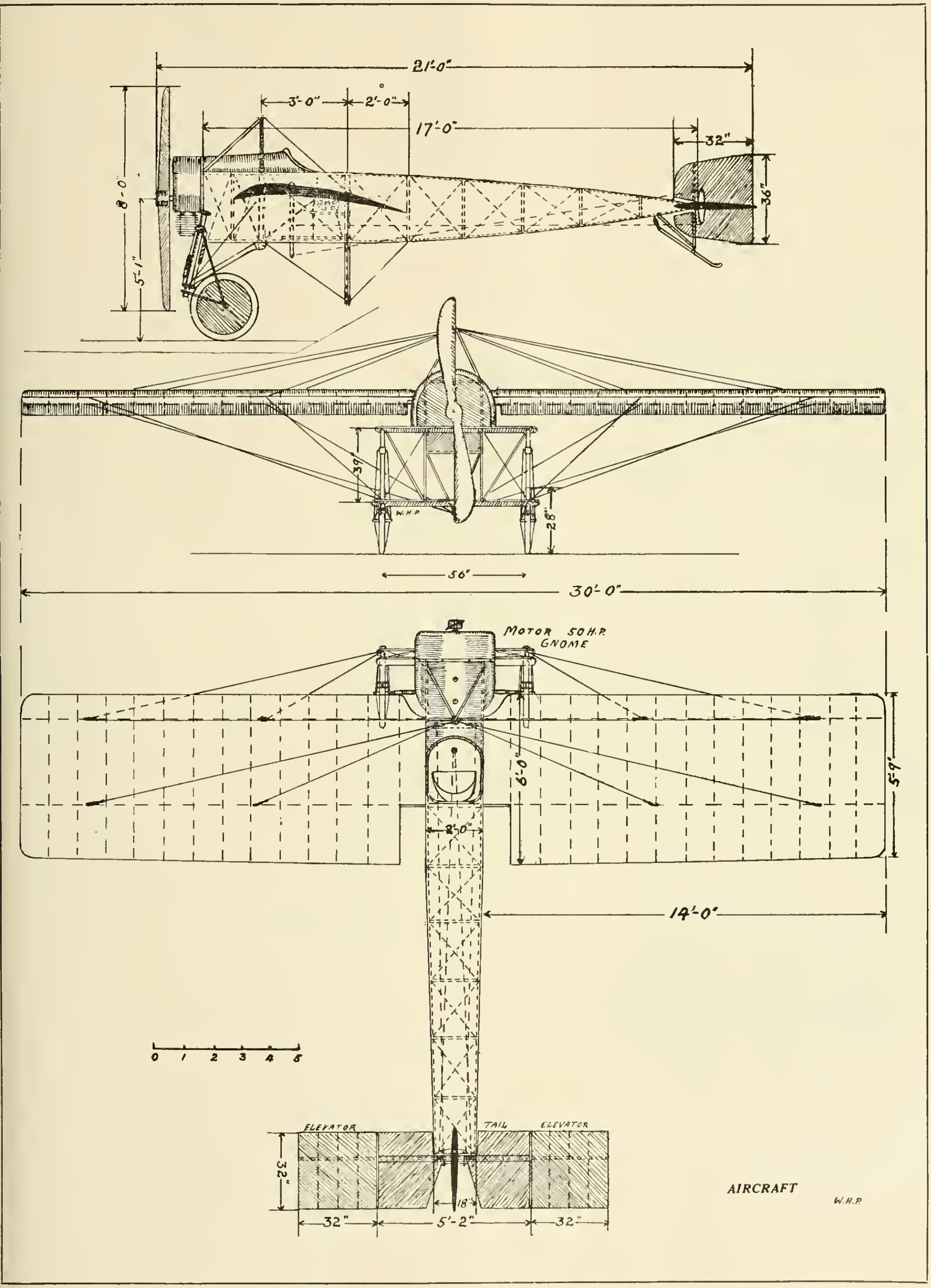
The landing gear consists of a Blériot type chassis, which on this machine is somewhat unique in that it slopes forward, and owing to its staggered appearance has earned the nickname of the "drunk landing gear." The idea of so arranging the landing chassis in this position is to bring the wheels well forward and prevent the machine pitching over on its nose.

CONTROLS.

The control arrangement consists simply of a universally mounted Farman lever and the ordinary foot bar.

GENERAL DIMENSIONS.

The general dimensions are: Span overall, 30 feet; length overall, 21 feet; chord of wing at fuselage, 6 feet; chord at wing tip, 5 feet 9 inches; engine, 50 H. P. Gnôme; propeller, 8 feet diameter by 5 feet 3 inches pitch; speed, approximately 70 miles per hour.



SCALE DRAWINGS OF THE KANTNER-MOISANT MONOPLANE

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WANTED—Gasolene Motor, ½ H. P., very light weight. H. H. Gridley, 18 Ashburton Place, Boston, Mass.

WANTED—$5,000 to complete a transatlantic aeroplane which I am building to compete for London Daily Mail $5,000 prize. Have a $10,000 aeronautic motor of 400 H. P. Machine can be completed in time to make flight this summer if money is forthcoming at once. Half the prize will go to party who furnishes the money needed to complete this giant aeroplane. My experience and the aeronautical engineers I have associated with me make the production of an aeroplane capable of crossing the Atlantic a certainty. Stanley Y. Beach, Aeronautic Editor of the Scientific American, 125 East 23rd St., New York City.

WANTED—A sixty or seventy H. P. Aero Motor; must be water cooled with radiator, propeller, magneto and all complete; price not over $500; Hall Scott 60 H. P. preferred but would consider Kirkham motor, 60 H. P. or over. Address Box 804, care AIRCRAFT.

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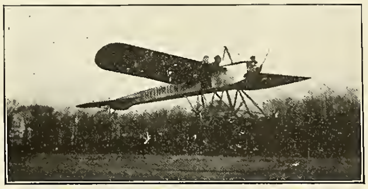

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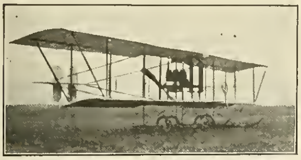

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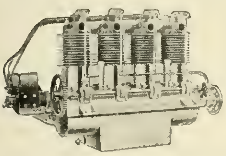

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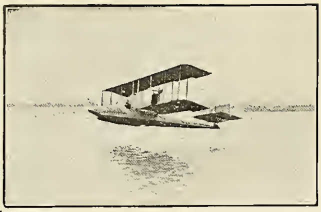

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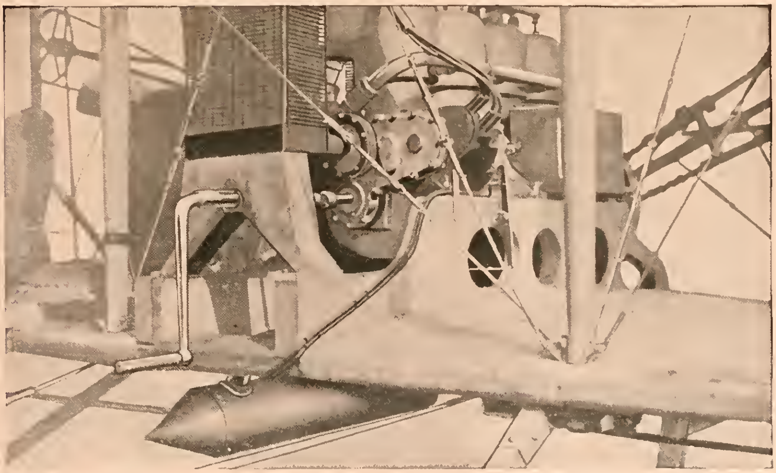

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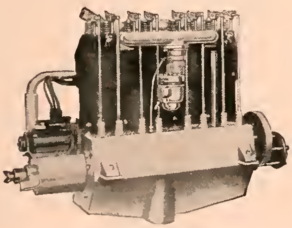

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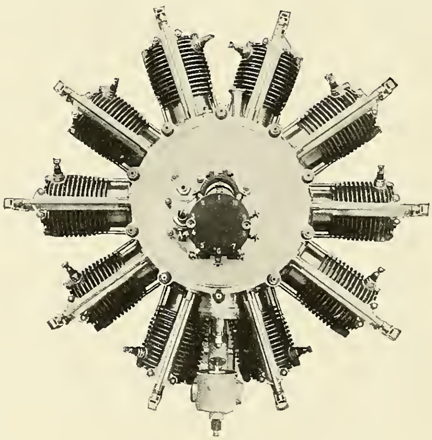

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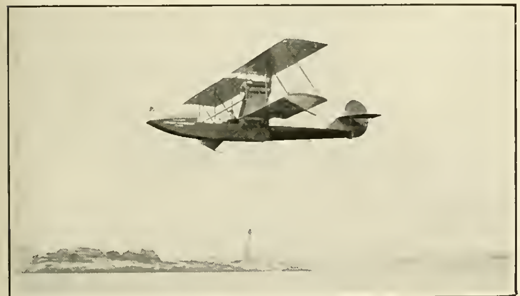

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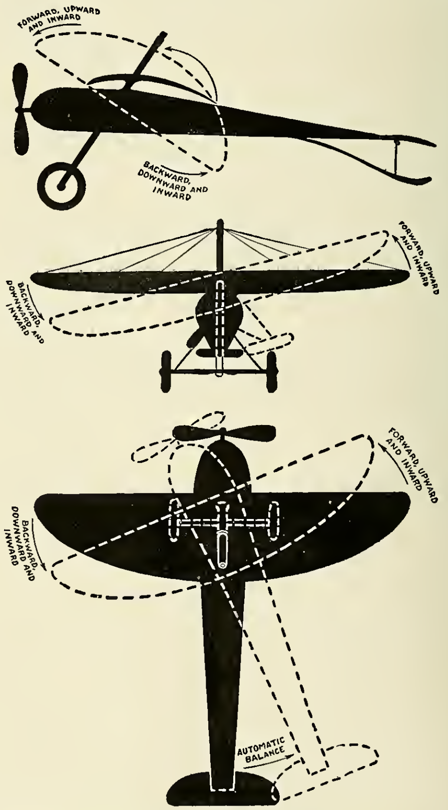

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LEARNING TO FLY

(SECOND ARTICLE)

By ALFRED W. LAWSON

LESSON 3—THE WARP.

The two great principles of flying are speed and angle. In fact, anything can be made to fly if given sufficient velocity and the proper balance. Even the dead weight cannon ball is made to fly, although its speed and angle are given it before it leaves the mouth of the cannon. As soon as it loses its speed it falls to the earth through the power of gravitation.

The aeroplane is made to fly by taking its power along with it in the shape of a motor and by creating its angle at the will of the pilot. I use the word "angle" in its broadest sense and not merely to designate the angle of incidence of the main planes.

Every aeroplane obtains its lift through speed and the angle of the main planes in the same way that a kite obtains its lift by the reaction of the air passing its inclined surface and exerting a lifting pressure thereon except that whereas the lift of the kite depends on the pull of the string and the speed of the wind passing it and reacting on it, the aeroplane depends on the pull of its motor to pass through the air at sufficient speed to retain the proper reaction.

It is quite easy to make any machine rise from the ground which has sufficient lifting surface set at a lifting angle and a motor with enough power to drive it forward with great enough velocity to create a lifting pressure.

It is quite another matter, however, to proportion things on an aeroplane so that once it rises from the ground it will balance properly and can be controlled at the will of the operator.

The principal thing in balancing an aeroplane is to distribute the weights in the frame in such a manner that they will be carried evenly by the main planes and the tail. For instance, if the operator's seat be placed back too far there will be too much weight on the tail and the machine will be tail heavy, in which case any of several remedies may be adopted: either the position of the pilot can be shifted forward to lessen the weight of the tail or the motor can be shifted forward to increase the weight ahead of the centre of pressure or by increasing the surface of the tail itself so that it has more lift; or by changing the angle of the tail itself so that by the given speed of the aeroplane it exerts an increased lift and consequently does not sink as before. This latter method, however, while being very common, is not to be recommended, for it must be remembered that any surface set at an angle varies its lift according to its speed and therefore with every increase or decrease in the speed of the machine there is an increase or a decrease in the lift on the tail which tends to cause it to either rise or fall, and disturbs the balance of the machine. The position of thrust and distribution of the weight in regard to the position of the main planes also plays an important part in the successful flying of every aeroplane.

Having gotten the machine properly balanced, the art of flying then consists of operating the controls, which in the Sloane-Deperdussin monoplane consists of the rudder, the elevator and the warp, and when the student masters these three controls, he is then able to fly. There are, of course, a great many other things to learn before one can become a successful flyer, but as far as the actual flying is concerned, the operation of the controls constitute the flying.

It is an easy matter to learn just how these controls are operated, but the student requires a great deal of practice before he is enabled to work them instinctively.

In the preceding lessons—one and two—I explained the working of the rudder and elevator, and this lesson will relate to the warp.

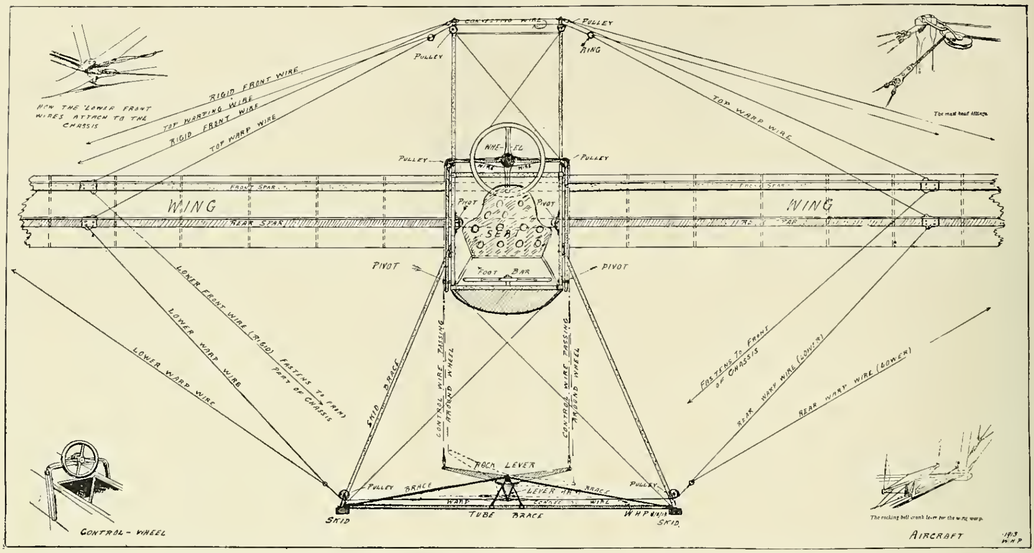
The function of the warp is to check the tendency of one side or the other of the machine dropping below the line of equilibrium from any cause whatsoever, or, in other words, to maintain lateral or side balance.

As was pointed out in lessons one and two, the fore and aft balance is maintained by the elevator, while the steering is accomplished by the rudder, and it was shown how necessary it is to keep these two things under control and in the same way it is just as necessary to control the lateral or side balance, for as soon as a machine leaves the ground or, for that matter, while it is still on the ground, it is always likely to be tipped sideways by sudden gusts, and these must be watched for by the operator and counteracted with the warp in the same way that he counteracted swerving with his rudder or pitching up and down with his elevator.

For this reason it is necessary to not only understand how to warp, but also how warping accomplishes its purpose.

When the machine is flying level there is an equal lift on each wing, but when the machine is thrown out of balance there is a greater pressure on one wing than on the other, and in order to level the machine up again there must be some means provided for reducing the pressure on the high side and increasing it on the low side. On the Sloane-Deperdussin this is accomplished by warping the wings. When the pilot feels the machine tilting over he turns the steering wheel towards the high side and this movement, through the medium of cables running from it to a warping arm mounted in the chassis, diminishes the angle of attack of the high wing, thereby decreasing its lift, while at the same time it increases the angle of attack of the low wing, thereby increasing the lift on this side and causing it to rise until the machine is level again, when the operator instantly turns the wheel back to its normal position. Of course, in windy weather these wind puffs or gusts are very frequent and the pilot is kept busy counteracting them. Then again on turns or in sudden swerves, the machine will bank or tilt over and in

DRAWING OF THE WARPING ARRANGEMENT ON THE SLOANE-DEPERDUSSIN MONOPLANE



To understand the working of the warp in the Sloane-Deperdussin monoplane, the reader can imagine himself sitting in the seat of the above drawing, facing the wheel and with both hands upon it. He can also imagine one foot on each side of the foot bar. As the mne achi speeds forward and he desires to turn to the right, he pushes his right foot forward on the foot bar with the result that his rudder is turned to the right which causes the right wing to fall below the line of equilibrium and his left wing to rise above it.

Now, in case he wishes to bring the two wings back to an equilibrium, he uses the warping wheel by turning it to the left which is toward the high wing, and if the reader will follow the turn of that wheel he will see that the wire is turned around it once and therefore it tightens the wire on the left side and loosens it on the right side, and by following the wire down the left side he will discover that it has lifted the rock lever below as indicated on the dotted lines with the result that the lever arm is moved to the left as can be seen by the dotted lines. In this way it will be noticed that the connecting wire to the right wing has been thrown over to the left which pulls the rear right wing downwards and thereby gives it an increased angle and therefore an increased lift, while the same movement releases the wire running to the left wing which permits the air to slide more freely in under it and thereby decreases its lift, the result being that the increase of the angle on the right wing and the decrease of the angle on the left wing, has the tendency of throwing the wings back into their normal position, at which time the wheel is also turned to its normal position if necessary. The same movements are made when flying straightaway when encountering a sudden gust which would raise the right wing and just the reverse movement in case it should raise the left wing.

The small drawing in the left corner gives a general appearance of the Deperdussin control and shows how the controlling wheel is mounted on the U-shaped arch column and is made to do service for both elevator and warp.

straightening out the pilot has to use his warp in the same manner.

In order to obtain as broad an understanding of the different working controls of the monoplane as possible, I took up the study of flying at two different schools at the same time. At the Sloane School I learned how to operate the Sloane-Deperdussin monoplane, while at the Moisant School I learned to operate the Moisant-Blériot monoplane.

The Moisant machine, of course, uses the Blériot controls, which differ from the Sloane-Deperdussin controls only in regard to the warping movement, which in this machine is accomplished by pushing the elevator lever towards the high side instead of turning a wheel as on the Sloane-Deperdussin. Both of these movements accomplish a similar warping movement of the wings, as can be understood from the accompanying drawings showing the operation of the two different types of controls.

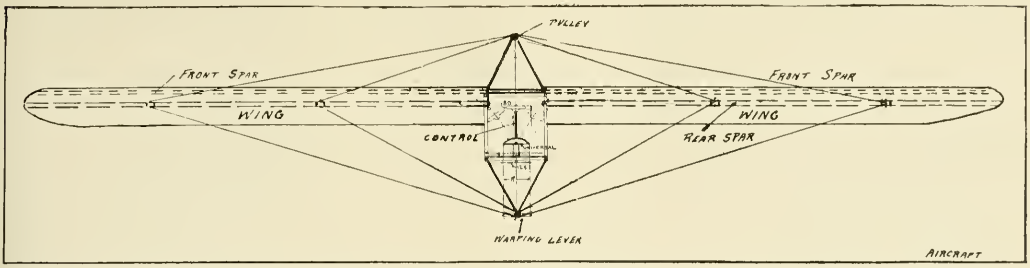
While three controls to a flying machine can be thoroughly learned by the student, the time necessary for him to master the three instinctively has proved to me that sooner or later another method must be adopted whereby the same principles of flying can be brought together with two movements instead of three. Especially does this become necessary in long cross-country flights where the machine is taken up to a certain altitude and is kept at an even keel for a number of miles at a stretch, for while on such trips the aviator does not want to be put to the necessity of constantly warping his wings with every little gust of air that is likely to strike the machine. This could be obviated by introducing more inherent stability into the machine itself and still be provided with a change control whereby the aviator could, when desired, operate his machine in a small ground or in tight places with as much control as he now has with the full three control movement.

The majority of students in the future will learn to fly for the enjoyment that they will get out of it and therefore the flying machine will eventually have to be made as "fool proof" as possible. There probably always will be a class of professional flyers who will want to do tricks in the air or surpass the ordinary flyer in air feats. This class of flyers, of course, will be given the fullest play in the controls. For instance, at the present time such flyers as De Moulinais, Garros, Audemars and Gilbert use the racing type of Morane-Saulnier monoplanes, which have practically no degree of inherent stability whatsoever. In fact, the whole tail plane of their machines is used as an elevator, while the wings, which have their greatest amount of effective warping surface at the rear wing tips, are capable of considerable warp and owing to the high speed of the machines, all the controls are exceptionally sensitive, so much so, in fact, that only the highest skilled pilots dare handle them. But while these machines can be handled successfully by these few adepts, they would prove fatal for the great majority of men who will want to take up flying purely for recreation in the future, and even these experts require years of constant practice before they can operate such machines.

These men, however, have proved to the world that the aeroplane can be flown not only hundreds but a thousand miles and more in a day and under very bad weather conditions, and now it remains for the builders to construct their machines with combination controls so that the average man can do the same thing with ease and safety.

Personally, I thoroughly enjoy overcoming the difficulties of mastering the controls of an aeroplane. Flying is the greatest

DRAWING OF THE WARPING ARRANGEMENT ON THE MOISANT-BLERIOT MONOPLANE



On the Blériot machines the warping is accomplished by pushing the control column toward the high side to restore the balance. Pushing the control column from side to side rocks the bell crank attached to it and operates through wires the warping lever mounted below and this in turn turns a pulley which pulls down one wing and lets up on the other, thus accomplishing a righting effect as explained under the diagram of the Deperdussin warping control.

sport man ever invented and it will not only eventually become a most useful and universal means of transportation, but will also develop a superior quality of mankind as far in advance of the present man as the present man is in advance of the ape.

LESSON 4—STRAIGHTAWAY FLIGHTS.

After the student has learned to handle the controls habitually during the "grass cutting" period, he is then ready to take to the air. The student, however, should be in no hurry to get off the ground until he is capable of using the controls properly and without hesitation. In fact, no one should be in a hurry to learn to fly, for practice, and plenty of it is the essential thing and it is better to go slow and sure than to rush along at too rapid a pace without thoroughly mastering each lesson. For if a student should, through an error, make a mistake upon the ground by using the wrong control, while he may injure the machine there is little danger of him injuring himself, whereas if he should make the same mistake while in the air it might mean a grave affair. During my "grass cutting" days I operated every control just as if I was in the air so that when the time came to fly there was no mismovement of the controls whatsoever.

Learning how to take the machine into the air should be acquired in small doses, and I found that by taking little hops at first of a few feet and coming down and then gradually lengthening these hops and likewise increasing the height a little each time, I obtained the desired practice and eliminated the danger of any mishap, for with each new flight I felt more capable and the "feel of the air" became more saturated in my system.

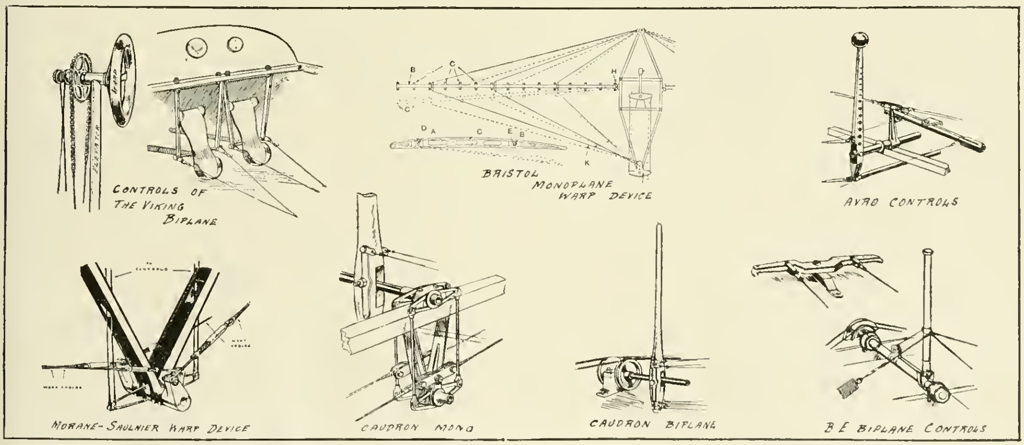
One of the essential things in flying is to make a good landing. In fact, the real skill required in flying a machine is not so much in taking it up into the air but in bringing it back to earth again without damage, so that in the first straightaway low flights the student can obtain just as good landing practice as he can by making high flights. It also requires just as much skill to balance the machine properly at ten feet high as it does a thousand feet high and the object of the straightaway flight is to give the student practice in levelling his machine out and keeping it at an even keel until he has reached his point of destination.

In making straightaway flights I enjoyed myself by endeavoring to utilize the controls in such a way that I could take the machine up to the desired height and then manipulate it to any level I chose and bring it back to the earth again without a jolt.

There were times when the machine would answer the controls like a clock and without apparent effort on my part, and then again at times I found that it required all of the skill I could bring into play to keep it steady. I learned as I went along that when there were little side winds which caused the machine to drift slightly to one side or the other, that the moment I started to change the direction with the use of the rudder the nose of the machine would perceptibly point upwards and one of the wings drop below the line of equilibrium.

(Continued on page 153)

AN ASSORTMENT OF WARPING DEVICES AS USED ON VARIOUS MACHINES



Special attention is called to the Morane-Saulnier and Caudron monoplane warping devices which perform their functions without the use of pulleys and consequently eliminate the danger of the wires jumping the pulleys or jamming.

THE WRIGHT COMPANY'S NEW HYDRO-AEROPLANE MODEL C-H

the result of Orville Wright's Latest Experiment on the efficiency and airworthiness of these craft

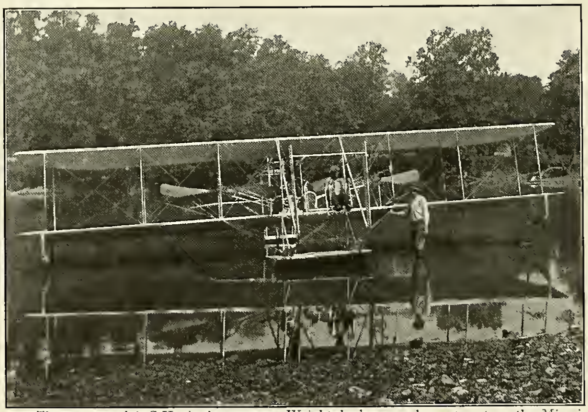
By GROVER CLEVELAND LOENING, B. Sc; A. M; C. E.

GROVER CLEVELAND LOENING who has been identified with aviation for many years, is the Engineer of the Wright Company. In 1910 Mr. Loening took his Master's Degree at Columbia University in Aerodynamics. the first collegiate work of this kind in America, and he was the pioneer in advancing intercollegiate aviation activities. In 1911, while finishing his Engineering Course, which he completed with the highest honors, he wrote his text book on aviation "Monoplane and biplanes" which has become an exceedingly useful work for the practical side of aviation. Perhaps his most important achievement, however, is the invention of his "fuselage-float" combination for marine aeroplanes which he incorporated in his first "Aeroboat" in 1911. Throughout 1912, and up to the present, Mr. Loening continued to experiment, with considerable secrecy, on the development of this type of craft, and his discoveries and developments, are said to be of great importance. Though quite young, Mr. Loening is recognized as a leading technical authority, as well as a practical aeronautical engineer. He is chairman of the Technical Committee of the Aero Club of America and a member of the Smithsonian Committee for development of naval aviation

ENTHUSIASM and "booming" are necessary for the practical establishment of marine flying, but it would be a short-sighted policy were we not to realize that many recent accidents both in America and abroad to flying boats and hydro-aeroplanes emphasize the necessity of vast improvement in these machines before they can be recommended for the exacting and general use of sportsmen. Some of the accidents have been due to breakages, a cause which good engineering will eventually eliminate, or at least reduce to a negligible minimum; others have been due to the inherent instability of most water flying machines of the types in use at present, a cause which, essentially, is much more important.

In the usual "Aeroboat" type, which has come to be adopted by many constructors as the standard for their "Flying Boats," the fuselage and hull are combined into a single boat unit, which one may say is under-slung to the aeroplane proper, and carries the rudders at its rear. By this combination a perfectly protected propeller position at the rear of the planes is obtained. The excess of flotation, due to the larger capacity of the fuselage hull over the float, gives greater seaworthiness and stability on the water, and the general design of the entire craft is more compact and offers less resistance. Granting these distinct advantages, there are, however, many features inherent to this type, which are distinctly bad, particularly in regard to flying qualities. The center of weight is lower; the efficiency is consequently reduced, with poorer wind-fighting qualities and ease of control. The center of weight is below the center of support; the large lateral surface of the boat causes a side gust to cant the machine badly; and if the craft, due to a false manœuver, begins to side slip, the recovery to normal is extremely difficult. These features apply equally well to the usual types of hydro-aeroplanes (aeroplanes mounted on floats), but not in as great a degree as in the single-propeller aeroboat type.

Where a biplane is used, as in several standard machines of the day, the basic element of good aeroplane design, that the centers of weight, pressure, resistance and thrust should coincide in one point, is lost. The center of resistance and weight are low and the thrust is high.



The new model C-H single pontoon Wright hydro-aeroplane at rest on the Miami River, Dayton, Ohio.

In all hydro-plane float or hull equipped aeroplanes the flat under-surfaces of the hulls induce a large movement of the center of pressure, which disturbs the machine in ascending and in diving.

There are some who believe that in the aeroboat development we have arrived at the ultimate type of a boat with wings, but the better versed in the technical characteristics of these machines consider them different from the hydro-aeroplane only in that they are mounted on a hull instead of floats; on careful consideration it is surely evident that the combinations of the aeroplane and boat features remain in many ways inconsistent. It is apparent, therefore, that the development of this field has required and still requires to a great extent the most thorough and careful kind of experimental investigation.

Since the first early experiments on hydro-aeroplanes which the Wright Brothers conducted on the Miami river in 1907, a remarkably clear understanding of the limitations, dangers and difficulties of hydro-aeroplane and aeroboat work has characterized the experimental investigations, at Dayton.

Mr. Orville Wright for over two years has consistently investigated the hydro-aeroplane with both single and double pontoons of various sizes, shapes, positions and construction, and at present Mr. Wright is engaged in further developments on aeroboats, having brought to a conclusion, recently, the development of the new type "C-H" hydro-aeroplane of remarkable efficiency and air-worthiness.

In a long series of tests during June and July that the usual Dayton reticence has kept from the knowledge of the rest of the world until completed, Mr. Wright steadily developed this new type of hydro-aeroplane and with it demonstrated the entire fulfillment of the purposes for which it was designed. Realizing at once the distinction between smooth and rough water craft with regards to water and air features, and that characteristics beneficial for hydroplaning were detrimental in a sea-way, Mr. Wright faced his problem with a full appreciation of its limitations. In the new model "C-H" he consequently worked out a type of hydro-aeroplane distinctly adapted to flying from small inland rivers and lakes and far more air-worthy than any machine of this type that has yet been built.

Two very important points serve as a basis for this new development.

One, that the machine must rise off the water very quickly because small rivers, due to bends and twists, and also small lakes, offer no opportunity for the long runs that almost all marine aircraft require before taking to flight. Two, that the machine must be a perfect flyer for the reason that practically all small inland rivers and lakes are bordered by trees and frequently by high banks. The climbing ability of the machine and

its stability in the worst kinds of down-trends and cross-currents of winds must consequently be as good as possible.

A glance at the illustration showing the place on the Miami river below Dayton where Mr. Wright conducted his tests and demonstrations indicates the restricted nature and size of the stream and the hazardous character of the surrounding country. It is well to realize at the outset, however, as did Mr. Wright, the topography of this nature is not the exceptional thing at all; on the contrary, it may be said to be the nature of 80 per cent. of the small stream and lake country in the middle west, central, easterly and northerly sections of the United States.

The Wright model "C-H" is a craft perfectly adapted to travel between towns and to opening up inaccessible country over the thousands of shallow streams that are open to no other kind of navigation.

This new craft is built with the usual simplicity, strength and lightness that already many years ago proved its worth. The hydroplane unit consists of the large center float and a rear float of a novel design and construction, which has been found unusually efficient for hydroplaning.

Throughout June and July Mr. Wright made over one hundred trips on this machine by way of testing its qualities, and on many occasions took passengers. On the 6th of June Mr. Wright made an interesting flight over Dayton with a passenger, landing on the Miami river between two bridges not more than one thousand feet apart, and, with perfect ease rising again at this point, he flew off over the town and back to his starting point. The wind on the return trip blew about twenty miles an hour, but the stability of the machine was excellent. Mr. Wright is continuing his work on the development of safe marine flying, and is engaged at present in working out many features of vital importance to it, so that the aviation world is justified in expecting much from the Dayton laboratories and proving grounds.

In model "C-H" the planes, rudder, motor and drive follow the standard model "C" lines. The span is 38 feet, chord 6 feet and the surface area is about 440 square feet. The weight empty is 920 pounds, exclusive of the weight of the center hydroplane float, which is 240 pounds. One of the new Wright six-cylinder, 60-H. P. motors is installed, driving two propellers, 8 feet 6 inches in diameter. The machine is fitted with special instruments recording the angle of incidence with regard to the air currents, etc.

The hydroplane unit consists of a single pontoon, 10 feet long, 6 feet wide and 10 inches deep, and a small pontoon supporting the tail. The form of the pontoon and its position has been determined with great care and a type arrived at that makes the water-planing features of this machine unusually efficient.

Mr. Wright has carried passengers on numerous occasions, and the best weight-lifting performance was made when he flew with two of his assistants, Jacobs and Taylor, and Taylor's boy, in addition to considerable amount of fuel, which made a total load on the machine of over 700 pounds.

The model "C-H" rises almost instantly to the top of the water, since it starts and leaves the surface under the expert handling of Mr. Wright in less than 10 seconds from cranking the motor.

The picture on the left shows Mr. Orville Wright flying a new Wright hydro-aeroplane above the Miami River, Dayton; while the picture on the right shows a close view of the new model C-H single pontoon Wright.

LEARNING TO FLY

(*Continued from page 151*)

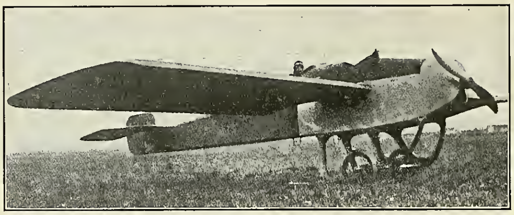
In such a case if the engine was running with just enough power to carry it along, as most school machine engines do, and the controls were not instantly changed to correct matters, the machine would stall and fall to the ground for the following reasons: First, when the rudder is moved away from the streamline it not only changes the direction of the machine but also adds a little drag and thereby decreases, to some extent, the speed of the machine; also when the wing falls below the line of equilibrium another drag is added which means more decrease in speed, and again, if the nose of the machine is raised it forces a greater angle of ascent which again decreases speed and, as the machine depends entirely upon speed for its lift, these three simultaneous drags would cause it to lose enough speed to deprive it of its proper lift. The difficulty, of course, is eliminated by slightly pointing the nose of the machine downward and by warping towards the high wing as the rudder is being turned.

Another essential thing for the beginner to understand is to not take the machine into the air at an angle of ascent too steep for the pull of the engine, for as the machine fell below its lifting speed it would stall and therefore slide backwards or sideways to the ground. The student should also get thoroughly grounded into his mind from the start that if at any time the engine should stop running while he is in the air to immediately point the nose of the machine at a safe descending angle, so that the power of gravitation will create sufficient speed to carry the machine safely back to the ground again.

There is much to learn in flying and one should obtain as much knowledge and experience as possible through practice close to the ground.

Each and every step in learning to fly has its interesting features and the student finds one continuous round of stimulating joy of which the ordinary mortal can form no conception. If one never got beyond the straightaway flights in learning to fly, he would have received sufficient reward in the shape of increased efficiency, both from a physical and mental viewpoint, to have warranted him giving his time and energy to the practice.

(Continued in October AIRCRAFT.)



The Italian Garbardini Monoplane which, piloted by Cevasco on August 1, bettered its own previous world's record for a flight with three passengers by covering a distance of 156 miles in 2 hours 45 minutes in a flight from Milan to Venice with three passengers besides the pilot on board.

Foreign News

BY

Arthur V. Prescott

Belgium

Belgium aviation is making daily strides, much greater interest being taken now than formerly. Nine brevets have been granted since January 1 of this year, this being a great advance, for last year a total of only 10 was granted in the 12 months. The previous year, however, was better than this, 27 brevets, including seven officers, being granted in 1910. In 1909 only one was issued.

The last brevet granted was to Prince Henry de Ligne, who obtained it on June 2 at Buc. Seventy-one is the total number of certificates, 19 of these being possessed by military officers.

China

While delivering the twelve Caudron biplanes ordered by the Chinese Government, M. Caudron paid a visit to Pekin and recently made several trips over the city. On one occasion he passed right over the President's residence and dropped a letter.

Cuba

By Margot Justiz.

ROSILLO TO REPRESENT CUBA IN GORDON BENNETT.

Domingo Rosillo, the Cuban aviator and winner of the Key West to Havana prize, has sailed for France.

He expects to represent Cuba in the Gordon Bennett aviation cup race at Rheims and will probably fly a special racing Morane-Saulnier monoplane. It will be the first time Cuba has been represented in this classic event and Rosillo is bending every effort to bring this honor to his country.

PARLA AND HIS CURTISS HYDRO CREATE MUCH INTEREST IN HAVANA.

Augustine Parla, the Curtiss pilot, who flew a standard Curtiss hydro-aeroplane from Key West to Bay Mariel, has been the hero of Havana ever since and has had nothing but honors showered on him. He has been continuing his flying on the Curtiss during the month and the machine has created a very favorable impression.

England

On August 7th at Aldershot Colonel S. F. Cody, the Anglo-American aviator, and his passenger, W. B. Evans, were killed when the new Cody aeroplane which they were testing fell from a height of 250 feet. Mr. Evans was a member of the Indian Civil Service and had obtained leave of absence to come to England to study aviation.

The aeroplane was a new one built by Cody for the Daily Mail hydro-aeroplane circuit of Great Britain and was fitted with a very heavy and powerful motor and it appears from all accounts that the engine section was too heavy for the frail bracing of the large span wings to support.

Of all aeroplanes the Cody was one that needed most attention to bracing, for owing to its tremendous weight, large carrying surface, large front elevators, and powerful motor, it was capable of a tremendous range of speed and consequently varying strains which demanded far heavier bracing than was ever used on Cody machines. It will be remembered that the Cody biplane which won the British Military Competition afterwards killed its pilot, Lieut. Harrison, owing to the collapse of the front elevators when endeavoring to straighten up after a descent.

CROSSES CHANNEL IN SELF-BALANCING DUNNE AEROPLANE.

A cable despatch states that on August 11, Commandant Jules Felix, a French army aviator, flew from Eastchurch to Boulogne in a self-balancing aeroplane, the invention of an Englishman named Dunne. The machine has the wings sloping backwards in the form of an inverted V and has no tail.

THE FLYING DERBY.

The Second Aerial Derby is announced to take place on Saturday afternoon, September 20th, permission having now been granted by the Home Office for the competitors to cross, on this occasion, certain usually prohibited areas. The course, which commences and finishes at the London Aerodrome, Hendon, extends over a distance of nearly one hundred miles, making a complete circuit of London. It will be remembered that this race proved one of the most exciting events of last year and it is expected that on this occasion over twenty airmen will compete, including many well-known Continental pilots who will fly from France and Germany some days prior to the race.

France

GILBERT FLIES OVER 1,000 MILES IN A DAY.

On August 2nd the French aviator, Gilbert, left Villacoublay, at 4:45 in the morning and arrived at Vitoria, Spain, 516 miles distant, at 11:45. He started again and landed at Caceres, on the Portuguese frontier, at 8 o'clock, covering 1,011 miles.

GUILLAUX MAKES ANOTHER TRY FOR THE POMMERY CUP.

On July 12 Guillaux on his Clerget-engined Clement Bayard monoplane left Issy at 4:02 A. M. in an attempt for the Pommery Cup and after a splendid non-stop flight he landed at Bordeaux at 9:30 A. M., where he was compelled to give up his intention of flying through to Casablanca owing to the thick mists.

HENRY FARMAN CARRIES E. ARCHDEACON ON HYDRO-AEROPLANE FLIGHT.

In pursuance of his usual week-end cross-country flying and in order to be present on July 13 at the inauguration of the hydro-aeroplane station at Boulogne, Henry Farman and Fischer on their hydro-aeroplanes left Buc on July 11. M. Ernest Archdeacon accompanied Mr. Farman, while Fischer took along his mechanic. Owing to bad weather conditions a stop was made at Crotoy from where the journey was completed on the next day.

AERO CLUB OF FRANCE SUSPENDS CHEVILLARD.

Owing to the spectacular flights made by Chevillard at Buc on the occasion of the aerial demonstration before the King of Spain in June and following the Commissaires Sportif's report on the subject, the Commission Sportif Aeronautique of the Aero Club of France has suspended Chevillard for two months from July 21 to September 21. A vigorous protest has been entered by Chevillard, and Henry Farman has sent in his resignation from the Aero Club of France on the same account.

JANOIR TRIES FOR THE POMMERY CUP.

On July 22, Janoir on his Deperdussin monoplane made an attempt to try and beat Brindejonc de Moulinais' record for the Pommery Cup, but was compelled to give up on account of rain. He started from Etampes intending to fly to Berlin, Warsaw and St. Petersburg, but near Lamur the rain was so heavy that he decided to turn back and he reached his starting point after a non-stop flight of 6 hours 5 minutes.

FARMAN BIPLANES DELIVERED BY AIR.

On July 22 Henry Farman, Chevillard, Fischer and Bill, each with a passenger on Henry Farman military biplanes, built for the French army, flew across from Buc to Etampes and on the next day three more machines were delivered in the same way by Chevillard, Gougenheim and Bill.

CROSS-COUNTRY FLYING ON A GOUPY.

On July 25 Caillieaux, on a Goupy biplane fitted with a ten-cylinder 80 H. P. Anzani motor, made a fine trip from Juvisy to Orleans and back.

LETORT FLIES FROM PARIS TO BERLIN IN EIGHT HOURS WITHOUT STOP.

On July 13 a remarkable flight was accomplished by Letort when he flew from Paris to Berlin, a distance of 571 miles in 7 hours 43 minutes. The flight was made without a stop and breaks the non-stop cross-country record of 513 miles held by Gilbert. The machine used was a Morane-Saulnier fitted with a nine-cylinder 80 H. P. rotary Rhone.

GRAHAME-WHITE TESTS NEW NIEUPORT.

At Villacoublay on July 25 Grahame-White was personally testing a new 80 h. p. Gnôme Nieuport which he recently purchased.

Germany

REPORT ON THREE YEARS WORKING OF PASSENGER CARRYING ZEPPELINS.

A report on the three years' working, up to June last, of the German company which owns the passenger Zeppelins shows that in 826 cruises, aggregating 1,835 hours, 17,221 passengers were carried some 64,172 miles. The "Victoria Louise" made 285 trips and carried 5,953 passengers, while the "Schwaben" made 230 voyages with 4,622 passengers and the new vessel "Hansa" 188 trips with 4,007 passengers. In 58 ascents, the latest liner, "Sachsen," has carried 1,336 passengers. The records of the previous vessels were: "Deutschland," 7 trips, 142 passengers; "L Z 6," 34 trips, 726 passengers; "Ersatz Deutschland," 24 trips, 436 passengers.

NEW RECORDS ESTABLISHED AT KIEL.

At a flying meeting held at Kiel recently resulted in several records being made: On July 14, Lieut. Canter made a new German record by taking a passenger up 3,270 metres, whilst Stoeffler took two passengers up to 1,740 metres, and Stiploscheck, with a load of 286 kilogs, climbed to 1,260 metres. On July 15 a reconnoitering competition was held and won by Lieut. Canter in 42 minutes, with Stiploscheck second in 46 minutes, and Von Hildsen third in 49 minutes. During the meet Lieut. Canter also improved the German altitude record by rising to a height of 4,087 metres, while on one of the opening days Prince and Princess Henry of Prussia enjoyed trips with Lieut. Canter.

AGREEMENT

Recently at the German foreign office Herr Von Jagow, the German Minister of Foreign Affairs, and M. Jules Cambon, French Ambassador, discussed plans regarding an agreement between the two countries on the subject of aerial navigation between France and Germany.

This agreement is as follows:

"All the aircraft belonging to the private citizens of each of the parties to the Note shall have the right to fly above the territories of the two countries. The passengers shall carry with them papers establishing their identity and nationality. In addition, the pilot must be in possession of proof that he is a properly qualified pilot. Each of the Governments shall have the right to impose restrictions on aerial navigation over its territory, and, in particular, to interdict flying over certain districts in the interests of the security of the State. These special restrictions shall be communicated by the one Government to the other concerned.

"Military aviators shall not cross the frontiers of either country without the express permission of the Government interested. Pilots of such aircraft shall take every precaution possible against crossing the frontiers. Should it happen that aircraft are driven by *force majeure* across the frontier, they shall at once descend, and hospitality shall not be refused. The nearest military authorities will take steps to ascertain that the pilot is a properly authorized Government officer, and that he has really been driven across the frontier through circumstances over which he had no control. As soon as this has been ascertained to be the case the aircraft shall be at once released. During the stay of such aircraft it shall have the character of extra-territoriality."

Italy

LATEST ITALIAN DIRIGIBLE MAKES OVER SIXTY MILES AN HOUR.

Some tests were recently carried out over Lake Bracciano with two new dirigibles belonging to the Italian army. One vessel is credited with a speed of just over 60 miles an hour, while the other is fitted up with special fighting platforms and carries several guns.

CROSS COUNTRY RECORD WITH THREE PASSENGERS.

The Italian aviator, Cavasco, on July 17, flew from Milan to Turin, a distance of 93 miles, carrying three passengers. The machine used was a Garbardini monoplane. This flight constitutes a world's cross country record with three aboard.

ACROSS THE ALPS TO MILAN.

Flying his 80 h. p. Blériot monoplane, the Swiss aviator, Oscar Bider, made a remarkable flight acros the Alps on Juyl 13. This flight is all the more remarkable owing to the fact that the crossing of the Alps was but an incident in his trip from Berne to Milan, a distance of 225 kilometres. He left Berne at 4:08 A. M., and landed at Domodossola at 6:40 A. M. After filling up his tanks he resumed his journey and landed at the military parade ground at Milan at 8:42 A. M. While crossing the Alps he attained a height of about 14,000 feet.

NEW ITALIAN HEIGHT RECORD.

At Turin on July 21 Sergeant Major Brack-Papa on a Maurice Farman biplane beat the Italian height record by rising to a height of 3,050 metres. The old record stood at 2,800 metres.

LONG FLIGHT BY DEROYE.

In an attempt for the Pirelli Cup for the longest flight with a passenger in a straight line, Deroye flew almost the length of Italy on June 17 and incidentally improved on the record for a nonstop flight with a passenger. Starting from Milan Deroye flew to Bani, a distance of 806 kilometres, in 7 hours 44 minutes. After a rest of four hours he restarted and flew to Brindisi, a distance of 106 kilometres. His flying time for the total distance—912 kilometres—was 9 hours 16 minutes.

Mexico

Major Miguel Lebrija, of the Mexican Aviation Corps, recently spent a few days in New York City while en route for Europe for the purpose of purchasing twenty aeroplanes for the Mexican Government at an estimated cost of about $400,000, and two dirigibles at a cost of approximately $500,000.

He stated that the Mexican Government had awakened to the possibilities of a great aerial fleet and that these orders would merely be the beginning of larger ones in the future. In fact, he was of the opinion that within a few years Mexico would have a thousand or more trained airmen as a part of their regular fighting forces.

Japan

Marc Pourpe, the pilot of a Blériot with which he is touring the Eastern Hemisphere, made a number of cross-country flights in Japan during the latter half of June. When effecting one of these on June 16 his machine capsized and threw him into the river Phu-Lang-Thuong, but without serious consequences. He subsequently made a number of good flights.

Russia

THE ST. PETERSBURG MEETING.

At the recent aviation meeting at St. Petersburg the following were the results:

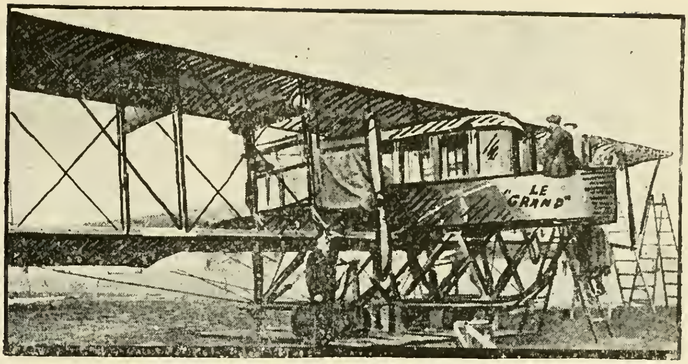
The race from St. Petersburg through Krasnoie Selo, and the return (60 versts): (1) Gaber-Vlynsky (Nieuport), 46 min. 9 sec.; (2) Agafonoff (Farman), 55 min. 41 sec.; (3) Evsukof (Farman), 59 min., 55 sec.; (4) Koutchine (Farman), 1 hr. 1 min.

The altitude contest: (1) Gabr-Vlynsky, 8,000 ft.; (2) Agafonoff, 7,000 ft.

The winner of the test for rapid *décollage*, or rising from the ground, was Gaber-Vlynsky, and of the bomb-dropping test, Agafonoff. This latter pilot was also adjudged the winner of a competition in order to determine which could describe the smallest figure of eight.

An attendant at the meeting was Lieut. Conneau, who arrived at the aerodrome on a Donnet-Leveque airboat.

At the conclusion of the competition, one for hydro-aeroplanes was held. Owing to the lack of experience on the part of Russian pilots in any form of water flying, this was not remarkably successful. Those competiting were as follows: Capt. Yatsouk (Farman), Sikorsky and Alekhnovitch (both on machines of the former's design), and Alexandrof (Maurice Farman). Sikorsky was placed out of the competition through magneto trouble. In the first test both Yatsouk and Alekhnovitch rose from the water at the same time, and, after flying for some distance and describing a circle, returned to the mark, Alekhnovitch in 8 min. 30 sec., and Yatsouk in 9 min. 20 sec. Alexandrov, Agafonoff, Valk, Koutchine, and Evsukoff then competed, not one of them fulfilling the necessary conditions.



THE SIKORSKY BIPLANE, A WORLD'S RECORD BREAKER.

The above picture shows the new Sikorsky ten-passenger biplane which as reported in AIRCRAFT has been making successful flights with that number aboard in Russia and on one occasion flew over the city of St. Petersburg at a considerable altitude. In addition this machine has established a world's passenger carrying record and a new Russian height record. On August 2, Sikorsky made a new world's record by carrying seven passengers for 1 hour 54 minutes, covering a distance of 56 miles and on July 22 Lieut. Aviator Aleknovitch created a new height record for Russia by rising to a height of 11,200 feet, which altitude was reached in 24 minutes while the descent from that height was made in 15 minutes. Both these flights were made at St. Petersburg.

The success of the new Sikorsky machine with its span of nearly 100 feet proves once and for all that large aeroplanes can be successfully constructed and operated notwithstanding the statements of some critics to the contrary, and while we do not say that the Sikorsky 'bus is the last word in aeroplanes or anyways nearly approaching it, we do say that large machines will some day be built possessing inherent or automatic stability and fitted with a number of motors which will make them as safe as any other known means of locomotion.

The Sikorsky biplane is fitted with four motors of 100 H. P. each driving a separate propeller. As can be seen the power plants are mounted on either side of the navigating cabin.

Robert Kemp in Germany

Düsseldorf, Aug. 7, 1913.

Editor of AIRCRAFT:

I have just arrived in Dusseldorf and went immediately to the Rheinische Aerowerke. It is a large four-story building situated in Düsseldorf-Obercassel just across the river from Düsseldorf. Like most of the German firms, it is doing a large business in aeronautic material, but confines its business solely to motors, propellers and accessories.

Mr. Trutschel, who is one of the managers of this factory, received me and to my surprise spoke English very well. He states that the business of the Rheinische Aerowerke has increased to such an extent, that they shall soon start the construction of a new factory. At present they are employing about one hundred persons, but shall be able to accommodate over five hundred workers in their new plant. They will adopt the Taylor system of management, which is now used in the management of the Bethlehem Steel Company.

Among the products of the Rheinische Aerowerke is a 100 H. P. 6-cylinder motor, which under the brake test develops a maximum of 104 H. P. Its performance is very creditable on the block when using a mixture of light and heavy petrol or benzine. This benzine is distilled especially for these motors here in Germany, being imported in its crude state from the United States oil fields.

The work on a new model motor has just been completed. This little engine stands about eight inches high and weighs only two and one-half pounds. On testing it gives a maximum three-fourths H. P. It is used by the German government for models 6 and 8 feet long, actually flying them as targets for the artillery practice.

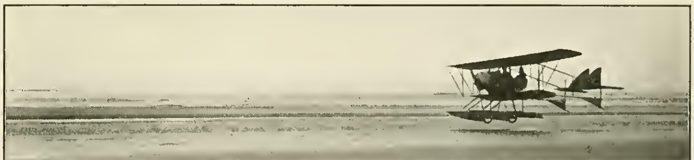
In our trip through the factory we visited the machine shop, pattern-room, propeller department, control or inspection department, tool-room and testing department.

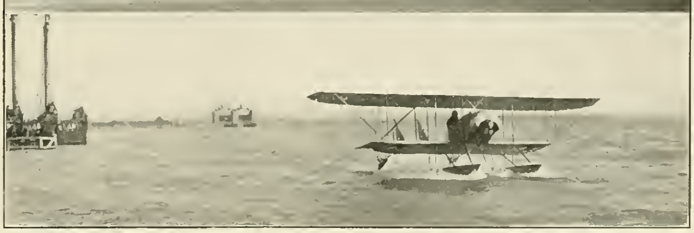
When discussing the aeronautical conditions Mr. Trutschel remarked that over two thousand machines were manufactured in Germany last year. The Albatros works, for instance, are turning out eighteen machines a week.

The Rheinische Aerowerke have given up the manufacture of aeroplanes, the last one which they made for the Spanish government was a land and water machine operated by two of their one hundred H. P. engines working together.

The new catalogue of the Rheinische Aerowerke is now in the making and will doubtless be ready in two months. Mr. Trutschel spoke of the patronage of the German government as one of the great reasons for the aeronautical advancement here in Germany.

Respectfully yours,
ROBERT KEMP.





THE LATEST CAUDRON TRIAD IN OPERATION.

The top picture shows the machine ascending from the beach with a passenger, while the lower one shows the same machine in operation on the water. Note how the wheels are built right into the floats and operate in the water.

THE QUESTION OF NATURAL STABILITY IN AEROPLANES

With Comments on the Lack of Stability of the Modern Aeroplane, together with a Description and Explanation of the Dunne Inherently Stable Machines

By WALTER H. PHIPPS

In view of the successful crossing of the English Channel on August 12 by Major Jules Felix, one of the leading French army aviators, on the Dunne inherently stable aeroplane, and later the successful demonstration of the machine's wonderful stability before Brigadier General Auguste E. Hirschauer, commander of the Aerial Corps of the French Army, and other leading army experts, at Villacoublay, on August 14, special interest attaches to this machine.

The Dunne aeroplanes are the invention of Lieut. J. W. Dunne, a retired British army officer, who has been experimenting and developing his ideas for an inherently stable aeroplane for over ten years. While the main principle of the stability of the Dunne machines was discovered years ago, its successful application to a modernly constructed aeroplane has only been obtained within the past few years.

The success of Lieut. Dunne and a great many others in the field of aviation to-day was obtained through purely practical experimentation and observation and not through engineering practices, as so many, who have never built machines and probably never can, believe to be necessary. By this it is not meant to convey the idea that good engineering does not play an important part in aeroplane design and construction, but rather that before applying our engineering methods to aeroplane construction we must first understand more about the principles of the aeroplanes themselves and discover new principles of stability and control, after which the building and constructing of the machine is simply an engineering job.

That this is true has been proved not alone in the case of the Dunne machines, but also in the case of the Henri Farman machines, which, as our readers will remember, have been developed through stage by stage from the early Voisin machines until their present form. First the side curtains were done away with, and then ailerons substituted, then the tail booms were shortened up to eliminate weight and drag, then the front elevator reduced in size and a tail elevator flap added in the rear to increase control and at the same time cut down resistance. Finally the big front elevator was done away with, as well as the double lifting tail in the rear, and in place a single flat tail with twin elevator flaps was substituted. All these changes were worked out simply through practical experimentation and observations. The same can be said of the Wright machines, the Blériots, the Curtiss, and many others, all of which machines have been improved through practical experimentation; but in all cases the main principles governing their stability have not been altered, for these makers, being the first in the field, concentrated their efforts on producing machines that would fly if their balance was controlled by the pilot rather than bending their efforts to have the machines balance themselves and be simply guided at the will of the operator.

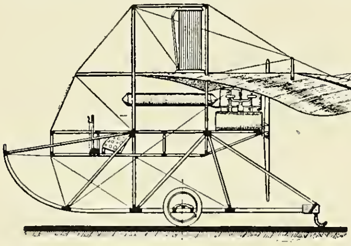
In the case of the Dunne machines, however, it has been the aim of the inventor not alone to produce a good flying machine, but also to produce one that would balance itself entirely, or at any rate to as large a degree as possible, and that he has done so is testified to by the recent wonderful performances of the Dunne biplane in the hands of some of the French military aviators. This is another one of those cases where an inventor was forced to give his ideas to another country through lack of recognition and support in his own country.

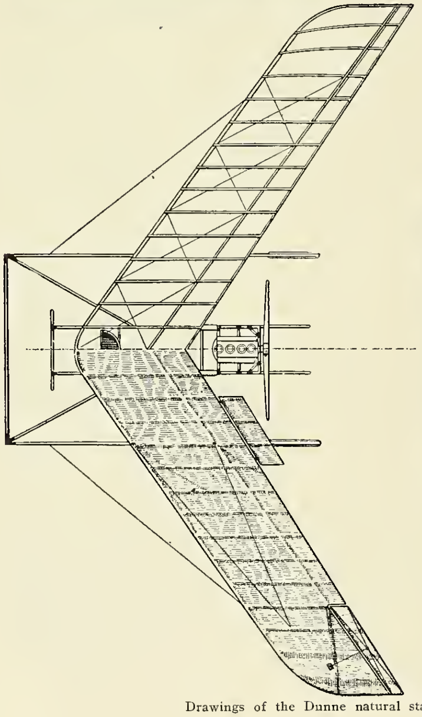
In order to understand how the Dunne machine has been perfected, it is necessary to study Mr. Dunne's experiments. He started with the idea of producing a naturally stable machine and developed his principles of stability through practical experimentation. He set himself to observe. He made models and watched them fly. He studied the works of others. As a result, at the start he adopted a general form of an aeroplane, then constructed a model which he tested. He observed its lack of stability. He noticed that the usual form of aeroplane lacked both fore and aft and lateral balance, and he attributed the lack of fore and aft stability to the fact that there was very little fore and aft support to an aeroplane. The whole main support of the average machine, in fact, being distributed along a long narrow aerofoil or main plane, which is only kept from tipping forward or backward through the presence of a tail and elevator situated in the rear or in the front at a point where by its action and leverage it could be made to straighten out the machine if it pitched downward or climbed upward. He saw that this arrangement depended upon the skill of the aviator for its safety and that such a machine, if left to take care of itself in gusty weather, would be almost sure to lose its stability and crash to the ground. He deduced, therefore, that an aeroplane to be stable fore and aft must carry its load distributed over a fore and aft length, and after numerous experiments he conceived the idea of sloping the wings backwardly in the form of a big open V, as shown in our accompanying sketches and photographs. This arrangement, without seriously affecting the lifting capacity, greatly added to the stability for the reason mentioned above.

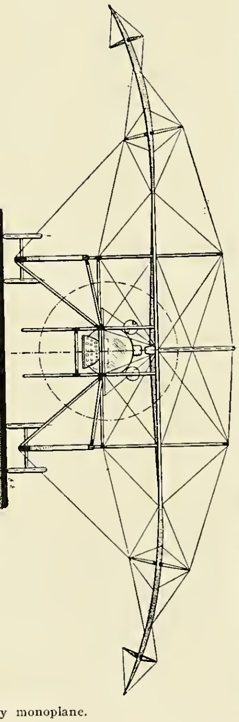
Another general principle that he was forced to adopt as a result of his own experiments and those of others was that the tail planes and main planes of a naturally stable aeroplane should make a dihedral angle with one another. Now, there is no tail plane on the Dunne machine, but the wings themselves sloping way backwards in a position where a tail would be on an ordinary aeroplane and having their tips turned down naturally present a dihedral angle to the front part of the planes, which have their ribs set at a very positive angle. We see right here that years ago Mr. Dunne had hit upon and discovered the principle of the fore and aft dihedral aiding stability which also the writer and other early model experimenters had hit upon over three years ago in conducting model experiments, and which principle has recently been exploited by M. Drzweicki, Robert D. Andrews, A. A. Merrill and others, as if it were something entirely new. True, it can be said that Eiffel's tests of the Drzweicki model revealed the fact that a negatively inclined rear plane not only produced stability, but lifted well, but while much was made of this discovery, it had already been achieved in practical form years before on the Dunne machines and on models flown in this country and abroad.

As for the why and wherefore of a great many features of the Dunne machine, it is probable that at the time of their incorporation in the design the inventor could not himself fully explain why he made them. He would probably say he simply made such and such a change for experimentation and for observation. In other words, the inventor, like so many others who have helped to make flying what it is to-day, have sensed rather than calculated or worked out some of the main features incorporated in their design. It is because of the fact that aviation is such a new branch of science and its theories not altogether known that aeroplanes have up to the present been developed in this way. These experimental discoveries will, of course, in the future serve as the basis of all aeronautical engineering, but for the present the great discoveries, as pointed out, will come intuitively rather than through calculations.

It is for this reason that so few engineers have achieved any success in aviation and of those few







Drawings of the Dunne natural stability monoplane.

who have been successful in aeroplane construction a brief study of their work will reveal the fact that this success was only attained after they had been forced to recognize the fundamental principles discovered by practical experimenters who came before them or who through their own trials and failures hit upon these same principles themselves and had to incorporate them into their own machines to make them practical flyers.

This is forcibly illustrated in the cases of Esnault-Pelterie and Louis Breguet, who, although fine engineers and pioneers in the field of aviation, were neither one of them able to make successful flyers until they were forced to recognize and take advantage of the discoveries of others who through experimentation had grasped and put into practical operation the main principles of flying.

In fact, the main principles of flight were discovered by careful observation and experimentation, and have been developed up to their present standard in this manner right the way through, for, were not Lilienthal's, Pilcher's, Etrich's and others' glider experiments simply the first practical demonstration of the fundamental principles underlying heavier-than-air flight? The development of the modern aeroplane can be traced back to these early experiments and the reason that the modern aeroplane has not developed much for the last three years is that aside from improvements in the construction and workings of the controls, no new principles for maintaining stability have been discovered by our leading aeroplane manufacturers in spite of the fact that some of the larger concerns have competent engineers on their staffs. The only thing the engineer has done in the development of the aeroplane has been to improve construction, cut down head resistance, calculate stresses, improve working parts and generally refine machines and this is all that he can do until such experimenters as Dunne, Fokker, Lohner and other experimenters in the line of natural stability furnish him with the principles governing such stability, when, and not till then, can he go ahead and develop them.

From the foregoing it will be seen that aviation will not be developed by engineers of the old school but by an entirely new set of men who will work out the solution of the naturally stable aeroplane according to new and in a great many cases undiscovered principles.

The principles and features of the Dunne aeroplanes have been arrived at in this way by a long painstaking series of experiments and trials such as are within the means of anyone to carry out, but through them all there must be a regard for the work and discoveries of others, and the inventor cannot expect to obtain success by departing from the already discovered laws governing the flight of an aeroplane.

The fact that Mr. Dunne realized and respected the simple laws governing aspect ratio, wing curvature, resistance, thrust, etc., probably accounts for his succeeding where so many others who have set about to revolutionize the art have failed utterly through disregarding the main principles discovered. How many of us are there who have not been shown patented designs of aeroplanes with the wings running lengthwise or with great big sail-like planes of almost square section or flying moving vans with planes stuck here, there and everywhere without regard to one plane shrouding another, the tremendous disturbances set up between them and the awful head resistance.

With the Dunne machine there is a reason for everything, but the reasons themselves have been evolved step by step with the design; they are not mere impossible ideas, but rather careful deductions based on past experience.

The Dunne aeroplanes are constructed both in biplane and monoplane form by one of the leading French aeronautic concerns. In spite of repeated demonstrations in England, the English government was too short-sighted to recognize their worth and the French, ever ready to at least test and encourage any new and feasible idea in aeroplane design which would be likely to aid in the development of her beloved fourth arm, were quick to seize the opportunity of testing these machines, with the result seen in the two recent exploits of Major Felix.

Turning to the machines themselves, of course the outstanding feature is the peculiar form of the planes, which, as pointed out before, greatly aid fore and aft stability. Now let us see how this form accomplishes lateral stability as well. When the Dunne machine is flying straight forward it cuts through the air like the point of an arrow, and in addition to deriving a lift from the reaction of the air, its shape, owing to the twisted shape of the planes, tends to direct some of this air toward the wing tips so that on each side the machine is steadied by a stream of air passing outwardly along towards the wing tips and tending to hold the planes steady. When the machine is hit by side gusts, that side which goes up tends to spill some of this stream of air, while the side that is lowered tends to grip more air, with the result that there is immediately and automatically a greater amount of lift set up on the low side, which instanly restores the machine to its balance. In fact, so well do the wings perform their work that they act almost instantly and there is not the degree of rolling noticed that occurs in a great many other machines using specially shaped wings to aid lateral stability.

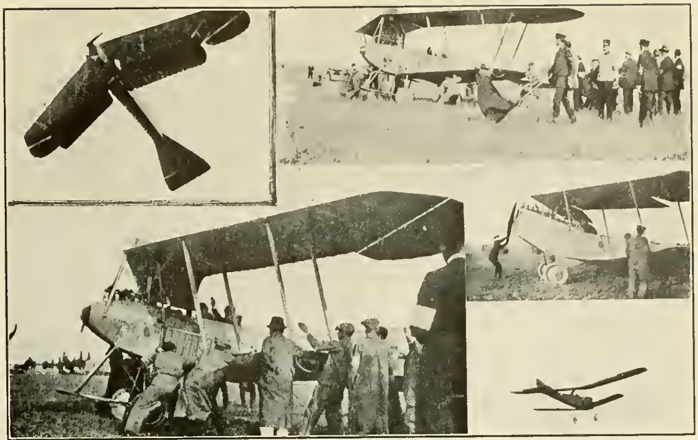
The chief merit of the backwardly sloping wings, whether they be peculiarly shaped like those on the Dunne or whether they be more or less standard planes set in this V form, as on a number of German aeroplanes, such as the Albatross Arrowplane, the Mars Arrowplane, the D. F. W. Arrowplane and a great many others, and in Austria, on the record-breaking Lohner Arrowplanes (which are illustrated herewith), and in this country in the new Hillery Beachey biplane, lies in the fact that longitudinal stability is increased, as explained before, while lateral stability on all of these machines is greatly increased by reason of the fact that when a machine keels over from a side gust there is naturally a tendency to turn on the low wing, and even in a very severe case or from over banking to side slip, which, if it occurs on an ordinary machine which has lost its speed, it is practically impossible to control. Now let us see what takes place with these arrow-shaped planes. Suppose a severe gust hits the right wing, the right side naturally rises, while the left side sinks, and there is a tendency for the machine to slightly turn and slide towards the low side, in which case what happens is this: The low wing presents an improved aspect ratio to the line of travel, while the high wing presents a poor one, and what is the result, viz.: the lift is at once increased on the low side, while the lift of the high side is decreased, the result being that the machine immediately straightens itself up. In addition the two wings viewed in relation to one another on a side slip or a side tip present a dihedral angle to each other, and, as before explained, this dihedral angle is sufficient to restore the balance.

It can thus be seen that the arrow styles of machines make use of the disturbing elements to correct their balance. In the case of the Dunne machine it will be seen that in practically every aspect that the machine could assume the formation of the planes presents a dihedral angle to one another in the line that the machine is traveling, and this dihedral formation immediately sets up a righting effect, due to the fact that the low part increases its lift while the high part decreases it.

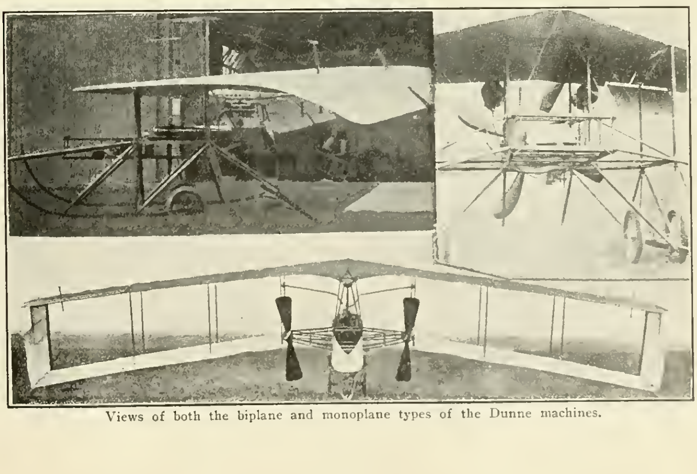
If these righting forces are correctly calculated, it can be readily understood how the machine can be constructed so that it will right itself immediately under disturbing conditions, and it will be seen that if this were the case it would be practically impossible to guide the machine, for in order to go up or down or go to the right or to the left the machine must naturally be thrown a little out of balance. For these reasons controls must be fitted. On the Dunne machine there are only two controls, as, owing to the pronounced backward sweep of the wings, the machine can be readily steered by setting up a drag with the aileron on one side. The control consists of two levers, one for each hand, which, when operated both together, work both aileron flaps and steer the machine up and down while when they are used separately to steer the machine.

The Dunne aeroplanes, both the biplanes and monoplanes, are constructed according to general aeroplane construction principles, the general dimensions of the biplane being as follows: Span, 46 ft.; length, 20 ft. 4 in.; chord, 6 ft.; gap, 6 ft. Total area main planes, 525 ft. The dimensions of the monoplane are: Span, 36 ft.; length, 21 ft.; chord, 6 ft. 3 in. at center, tapering to 5 ft. at the end. Total area, 230 sq. ft.

The angle of the planes to a line drawn straight through the body is 58 degrees.



Some modern examples of the backwardly sloping V-shaped wings applied to standard type aeroplanes. The illustration shows several views of the well-known Austrian record-breaking Lohner arrow-biplanes and the centre inset on the right shows the Bomhard arrow-biplane, which, in addition to the backwardly sloping top plane, has a peculiarly curved lower plane. As evidence that the V-shaped planes are very efficient, it is only necessary to point out the fact that the Lohner arrowplanes or Pfeilfliegers hold the world's record for altitude with pilot and two passengers when at the recent Vienna Meet in competition with all the leading European makes, Illner, with two aboard, climbed 16,430 feet, and this with a heavy water-cooled motor of 120 H. P.



Views of both the biplane and monoplane types of the Dunne machines.

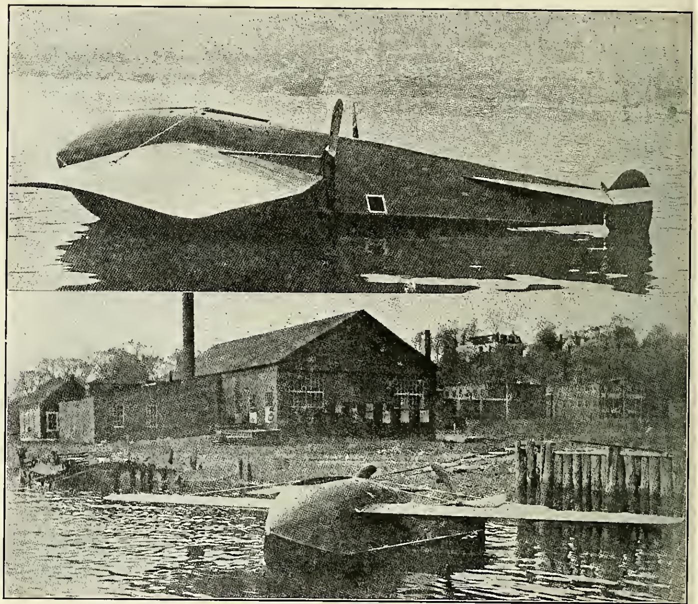
THE NEW GALLAUDET FLYING BOAT

The new Gallaudet flying boat, as can be seen by the accompanying photographs, is of the monoplane type, with fish-shaped body and stream-line wings, and the only parts outside of body and wings that can produce head resistance are the stays, propeller frames, and short strut supporting the fixed tail surface. Its builders believe that for a machine of its size it establishes a world's record for low head resistance.

Its principal dimensions are: Spread, 36 feet; length over all, 27 feet; wing surface, 234 square feet; beam of boat, 4 feet; draught, 1,500 lbs.; displacement, 12 inches.

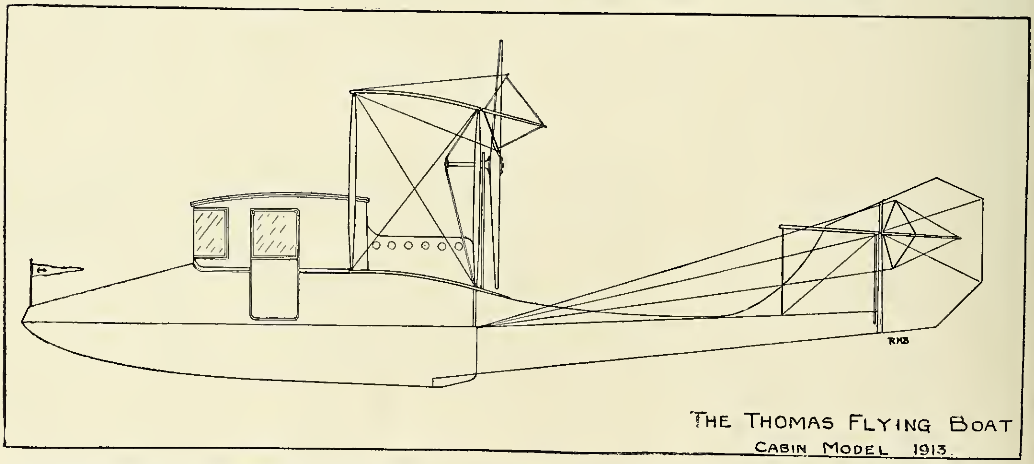
The hull is built entirely of three-ply mahogany, five-sixteenths of an inch thick on the bottom, plus one-quarter of an inch thick elsewhere, fastened together with copper rivets and water-proof cement, finished inside and out with spar varnish. The interior of the hull is divided by longitudinal and transverse bulkheads into thirty water-tight compartments, and the whole covered over and sealed up by a water-tight deck. The wings, power plant and propellers are supported by a frame of steel tubing, which in turn is bolted to longitudinal stringers finished flush with the deck. The upper body contour is formed of steamed ash ribs and battens, and upper body and wings are covered with linen shrunk on and finished with spar varnish; the wings are built on a steel tubular mast, two feet aft of the entering edge, extending through the machine from one wing tip to the other, three stays three-eighths of an inch in diameter and tested to 15,000 pounds each, are fastened to the wing masts six feet from the tips, drawn through pockets in the steel body frame work and tightened against each other by three heavy turnbuckles inside the body.

Two seats are arranged tandem in a roomy cockpit well forward. The pilot alone uses the front seat; with passenger on board the pilot may sit in either seat; the usual instruments, switches, etc., are mounted on a mahogany board on the left side of the cockpit and are accessible from either seat. A good-sized door opens in the right side of the cockpit wall, permitting easy entrance to either seat. The warping mechanism is built up out of steel tubes fastened to steel bell cranks with steel pins and split cottars. The rear controls are operated by steel cables, connected to steel bell cranks. No sheaves are used in any of the controls. The engine is a 50 Gnôme mounted low down inside the body. Its axis is across, and provided with compressed air starter, and it turns backward. By this mounting the engine is put in a safe position and its gyroscopic effect, such as it is, is made to assist in turning and balancing. The engine is connected by spur gears to a cross shaft which extends through the body out into the wings to gear boxes mounted on the wing mast. From these gear boxes the propeller shafts run back to the propellers mounted on frames at the wings' rear edges. The propellers are three-bladed, 6 feet in diameter, 5 feet 3 inches pitch, and are easily demountable. The cross shaft is broken by plauges inside the body, so that by taking off a few nuts the wings can be quickly removed as in the case of any monoplane. All important bolts and nuts on the machine are nickel steel, the stay fastenings are chrome nickel steel heat treated, all the gears are chrome nickel steel heat treated and run in oil in oil-tight boxes. Double row ball bearings are used throughout.



Two views of the latest product from the Gallaudet factory at Norwich, Conn.

THE NEW THOMAS FLYING CRUISER



Side view drawing of the latest Thomas enclosed cabin type flying boat. This shows the trend of design in the flying boat line and is, no doubt, another link in its evolution. The next step in the development along this line will be to increase the length of the hull which will permit of lengthening out the cabin part and make it possible to fit sleeping bunks in the cabin. This also will necessitate, of course, greater wing surface and without doubt provision will have to be made for folding the wings in against the boat some way, so as to prevent the machine from being blown about when at anchor or in case the motor fails to work. Motor trouble will, no doubt, be obviated by the installation of two or more motors so that in case one broke down there would still remain sufficient power to propel the boat to its destination on the water.

THE WRIGHT INCIDENCE INDICATOR

Mr. Orville Wright has for a long time strongly advocated the use by aviators of an instrument showing the angles of incidence in the air, so that a pilot who knew his machine's limiting range of angles could be sure of remaining within safe flying positions.

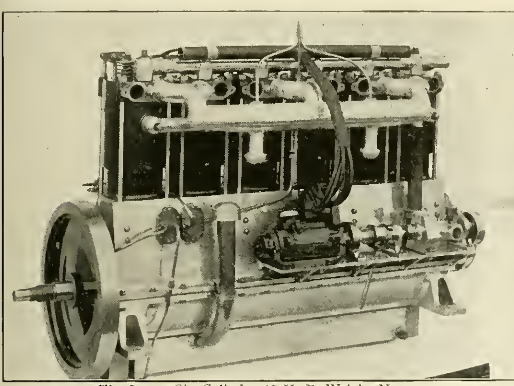
On climbing, if the machine is set at too great an angle, the lift falls off, the drift increases, and the machine first begins to sink and then in losing headway to "stall." In diving, if the angle is made too small, the center of pressure moves very far back, and the degree of safety is greatly reduced by its proximity to a position of down pressure on the top of the wing; it also causes the possibility in again turning up of receiving a pressure on the under side of the tail surface, which would prevent the machine recovering from the dive. There are many now who consider this the cause of a large percentage of the accidents that have taken place.

If in climbing, diving or in normal flying the air currents are disturbed, rising, descending or deflecting from side to side, the angle of the machine with the horizontal, which is registered by the ordinary gravity clinometer, does not represent the angle of the planes to the air. This latter, however, is the important thing to know, and as no such instrument was on the market, the Wright Company proceeded to turn out one of their own, which has recently come into extended use in the Government service. In ascending or descending currents, to fly properly balanced, the machine may take an angle quite out of proportion to the horizontal, but with this incidence indicator the pilot is positive the planes are receiving their proper pressure, and that the center of support has the correct relation with regard to the center of weight.

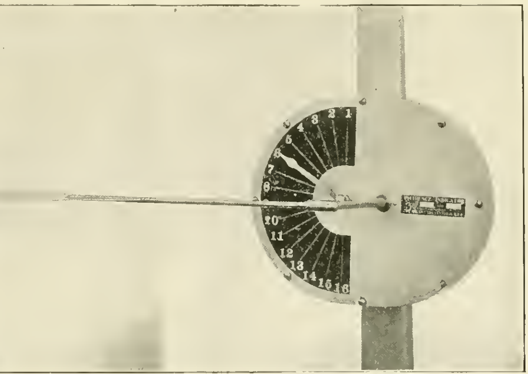
It is safe to say that keeping within the range of safe flying angles would eliminate almost 80 per cent. of the accidents.

As may be seen from the illustration and diagram, the Wright incidence indicator consists of a light air vane, which operates a pointer on a dial by a special mechanical contrivance overcoming any gravitation influence. The pointer indicates at any time the angle of the chord of the planes with respect to the air currents through which the machine is flying, and as already stated, is entirely independent of gravity in distinction to the usual clinometer, which takes no account of ascending or descending currents.

The weight of this instrument is 2¼ pounds, and the dial can be read clearly at a distance of 10 feet. It can be fitted to any type of biplane on a convenient strut, and on a monoplane can readily be fitted to one of the cabanes, or to some member of the chassis.



The Latest Six Cylinder 60 H. P. Wright Motor.



The new Wright angle of incidence indicator.

NEWS IN GENERAL

By D. E. BALL

Hempstead Plains

The biggest event of the past month at the Hempstead Plains Aviation Field was "Navy Day," held in the afternoon of July 26, which was probably the most successful meet held in the United States this year and attracted in the neighborhood of 3,000 spectators.

Primarily, the exhibition was for the purpose of demonstrating to naval officials the efficiency of air craft for war purposes and about twenty machines were reviewed by the navy officials present, including some school machines which were not sent into the air. There was plenty of flying, however, for there were nine machines in the air at one time.

For the Moisant Company, Harold Kantner, C. Murvin Wood and G. R. Puflea made some splendid flights in three different Moisant monoplanes, Kantner reaching an altitude of 3,800 feet in the new Kantner-Moisant "Blue Bird." Joseph Richter took up the Shneider biplane to about 2,000 feet altitude. For the Sloane Company, Guy Gilpatric took up the passenger carrying Deperdussin machine and carried several passengers including both men and women, while Allan S. Adams took up the little 35 H. P. Deperdussin school machine for a good flight. Frederick G. Hild cut up some of his usual antics in the air with his Blériot type monoplane, while George M. Dyott gave a splendid exhibition of speed flying with his new military monoplane.

Horace Kemmerle and Charles V. Holflich gave a fine exhibition flying the Boland tailless biplane, while Albert S. Heinrich showed off to good advantage with the speedy Heinrich monoplane. Andrew Houpert made a good flight around the field in his monoplane, but unfortunately upon landing he struck a bad piece of ground and turned the machine up on its nose. There was no particular harm done, however, and this was the only thing that looked like an accident during the meet. George Hamilton also took his new monoplane into the air for a short flight.

Taken altogether, the meet was a great success, and the men who are entitled to the most credit for its organization are Douglas Houghton and Mortimer S. Delano.

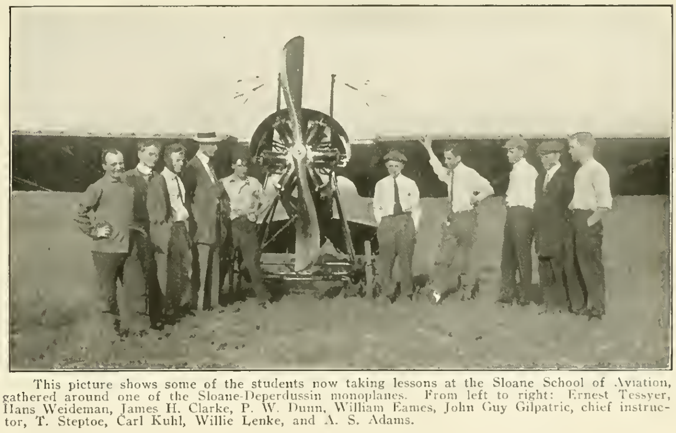
MOISANT

A great deal of splendid flying was done during the past month by the Moisant students. G. R. Puflea, who graduated from the school in July, has taken the place of instructor temporarily during the absence of C. Murvin Wood, who recently flew from the Hempstead Plains Aviation Field to Washington and remained there to demonstrate to government officials the efficiency of the new Kantner-Moisant monoplane.

Mr. Puflea would make a good instructor for any school or demonstrator for any concern wanting him in case he does not remain with the Moisant Company after Wood's return.

Capt. Dante Nannini and S. Gordon are running neck and neck in their race for pilots' licenses and they are both about ready to take them at any time. These two men are now using the Gnôme motored Moisant and some of their flights appear as if made by professionals.

John McCue has been making some very good straightaway flights during the past month. The



This picture shows some of the students now taking lessons at the Sloane School of Aviation, gathered around one of the Sloane-Deperdussin monoplanes. From left to right: Ernest Tessyer, Hans Weideman, James H. Clarke, P. W. Dunn, William Eames, John Guy Gilpatric, chief instructor, T. Steptoe, Carl Kuhl, Willie Lenke, and A. S. Adams.

A group of well known aviators lined up against the Heinrich monoplane at the recent Hempstead Plains Meet. From left to right: U. Buttin, Alfred W. Lawson, Leonard Bonney, Captain Thomas Baldwin, Julie Melancon, Albert Heinrich, Mrs. Mary Simms and Arthur Heinrich.

latest pupil to join the Moisant School is Arthur Lagarde, who hails from New England.

Chief Pilot S. S. Jerwan had a busy month of it, for besides giving his general superintendence to the School he also assisted materially in the management of Wood's successful flight to Washington.

BOLAND

Charles V. Holflich has been taking out the Boland tailless biplane for a joy ride each morning when the weather was good and in each instance took along a passenger for the trip.

SLOANE

The number of students at the Sloane school increases each month until now there are twelve altogether enrolled, as follows: Miss Margaret Stahl, Charles W. Dunn, Alfred W. Lawson, James H. Clark, Carl T. Kuhl, Willie Lenke, P. V. Martino, Hans Weideman, Thomas Steptoe, H. E. Allyn, Victor H. Miller, Antonio Neichol.

All of the students except A. Neichol have been making good straightaway flights. Carl T. Kuhl, Hans Weideman and H. E. Allyn, however, have made their first circles and it is likely that all the others will have followed suit before this is in print. Willie Lenke, Charles W. Dunn and James H. Clark are showing considerable aptitude in their work, while Thomas Steptoe and Victor H. Miller, who have not had quite so much practice as the others, are close upon their heels. Leonard Bonney, whose contract with the Sloane Company, as instructor, expired recently, has accepted a position with the Christmas Aeroplane Company, of Washington, and Guy Gilpatric is now the chief instructor, with excellent assistants in Allan S. Adams and Ernest Tessyer.

Charles Baysdorfer, who returned from an extended exhibition tour recently, has been about a week in thoroughly overhauling and rejuvenating the Sloane-Curtiss type biplane.

HEINRICH BROTHERS

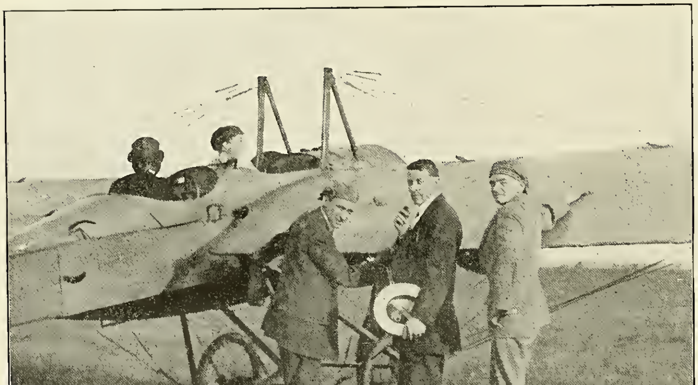
The Heinrich Brothers school produced good results during the last month and the students made rapid development in the art of flying. The Heinrich Brothers inaugurated a new method for straightaway flights by starting their pupils from the front of the hangars and permitting them to make straightaway flights over to the second hill, increasing the regular runway distance about double, or giving them about a mile stretch for each flight. These Heinrich Brothers are very progressive young men, full of new ideas, and do not wait for other people to lead the way; they believe in taking the lead themselves and adopting new tactics wherever those tactics will avail them anything. George A. Page, Jr., and Fred Jacobs are now making circular flights, and no doubt will shortly be ready for their pilot licenses. Mrs. Mary Simms has been making some good straightaway flights during the past month on the Heinrich monoplane.

RUTH LAW.

On the morning of August 16 and about 6 A. M., Ruth Law and her cortège of managers and mechanics arrived at the Hempstead Plains Field for the purpose of taking up a temporary residence there in one of the hangars preparatory to taking to the road again to fill exhibition dates.

Miss Law had just returned from an exhibition trip through New York State and New England where she met with considerable success giving flying exhibitions in the various cities.

Instead of shipping her machine by express or freight, which is the usual custom of exhibition flyers, Miss Law has it set upon a truck and pulled behind her automobile from one town to another. In this way she not only saves the railroad fare and express charges, but is always sure to have her machine at the place on time.



During the recent meet at the Hempstead Plains Aviation Field, the Sloane-Deperdussin passenger carrying machine was kept busy taking up passengers for flights. This picture shows Mr. Guy Gilpatric at the wheel about to start on a flight with Mrs. A. M. Francis, a prominent Chicago society lady, as a passenger.

California News

By R. H. Blanquie.

Flying has suddenly come to a stop at Sunset Aviation Field, which was regarded as being one of the finest aerodromes in the State. This unfortunate happening is due to the dredging in the Oakland Estuary, which borders it, and the mud pumped out being poured over the best portion of the field has rendered it absolutely worthless for flying purposes. Many moons will elapse before it is again in fit condition for aviation. It will be a serious loss to airmen of this part of the State, as favorable flying grounds are rather rare in this locality.

Such aviators as Bob Fowler, Roy Francis, Didier Masson, Frank Bryant and others had established their headquarters on this field during the winter months. Just previous to the dredging quite a few machines were to be seen flying about or within the hangars. Silas Christofferson, the well-known San Francisco pilot and constructor, was to be seen training a Chinese pupil on his Curtiss type double-control biplane. Gus Seyfried, a promising monoplane flyer, taught himself how to handle in fine style a several times rebuilt Blériot, which tradition claims to have once belonged to none other than our old friend Louis Paulhan. It is reported that Seyfried has signed a contract with the International Aerial Corporation under the terms of which he is to fly any dates that the company may sign up.

Donnet, a Frenchman, has built a Nieuport type monoplane, leaving the fuselage open as on the ordinary Blériot, so as to offer much less resistance to the wind. With it he expects to make things hum.

Tom Gunn, the Chinese aviator, was also to be seen trying out his tractor biplane, which formerly had a boat attachment to it. Proving satisfactory, he took it apart and shipped it to China, where he now is.

John S. Likas was recently granted a special permit by the harbor commissioners of the Bay of San Francisco to operate an aerial trans-bay pleasure service for those wishing to enjoy an excursion in a heavier-than-air. The local papers stated that he wished to establish a regular ferry service between the bay cities, but common sense shows how absurd such a plan would be. But aerial pleasure services over water have already been installed with success elsewhere, so there is no reason why the Fair City could not have one also.

"Just all same like a big bird with body an' wings an' tail he goes up an' down an' around." So soliloquized Capt. Dave Numana, the aged chief of the Piute Indians, after having soulfully admired a flight by Adolph Sutro on his big hydro-aeroplane over the Bay of San Francisco, opposite the Fair Grounds. The old Indian came all the way from his reservation at Pyramid Lake, Nevada, to satisfy his craving desire to see an artificial bird in action. News of wonderful feats accomplished by birdmen had come to him far up in the mountains, and he was duly rewarded by the excellent aviator, Sutro. No persuasion, however, could induce him to take a stroll in the air, being totally content to watch the evolutions of the machine from the shore. As the craft skimmed swifter and swifter over the water and rose to a gentle angle his joy knew no bounds, and forgetting his Indian stoicism, he let out a yell, not a Piute war-cry, but a common everyday American oath used by his white brothers to express the same feeling he was experiencing.

Allan Lougheed has been busy with his Hall-Scott motored tractor "Alco" biplane and has been out making flights at every favorable opportunity. A number of passengers were given rides while the pupils were out in the machine almost every day. The Chinese pupil, Wong Kin, is making good progress, while Theriot is handling the craft well.

The monoplane flying boat constructed by Patterson for Stanley Hiller is now completed and ready for flying. The machine is of a very interesting type and has a hull formation similar to the Patterson-Francis biplane, but carries a monoplane lifting surface in place of the biplane cellule on the Francis machine. The Hiller machine follows the practice of the German Fokker monoplane in that it has the wings set low down and a very pronounced dihedral angle and the wings sloping far backwards, as on the Fokker and Dunne machines. The engine is placed high up above the wings and drives through chain and sprocket transmission two opposite revolving tractors. There is no provision for manually operated control, the shape and formation of the wings and the position of the motor being relied upon to accomplish inherent lateral stability in the same manner that the Fokker monoplane accomplishes this end as described in the January, 1913, Aircraft, page 322.

Chicago News

By S. R. Brustmann.

After withdrawing from the Great Lakes Cruise, Glenn L. Martin and his assistant, Charles Day, demonstrated their hydro-aeroplane at several east-shore resort points, and on Tuesday, July 22, returned to Chicago. They left Muskegon at 7:30 a. m. and arrived off the Chicago Yacht Club at 1:30 p. m., stopping at St. Joseph and South Chicago for fuel. The following Saturday Martin piloted his machine to Lake Forest, where he took up headquarters in one of the two splendid hangars

Here is a picture that we want all the readers of AIRCRAFT to ponder over; it is food for reflection. This is a picture of the employees of the Curtiss Aeroplane Company at Hammondsport, N. Y., and it is perhaps the greatest evidence that we can produce to substantiate our oft-repeated claim that the aeronautical industry in the United States is gradually forging ahead and assuming good proportions. There are at the present time more than 100 employees of the Curtiss Aeroplane Company. This, however, will be but a small number in comparison to the great aeroplane factories of the next few years which will spring up and develop in the same manner as the automobile concerns have done during the past few years.

which Harold F. McCormick has erected on the beach near the McCormick home.

Mr. McCormick's air-yacht, "Edith," arrived here on July 23, and was assembled under the direction of Glenn Curtiss. C. C. Witmer, who has been engaged by McCormick to pilot the Edith, accompanied Curtiss during the trials on the following Saturday. The next day Mr. McCormick entertained several friends, who made extended flights in the Edith and in Martin's machine. Mrs. James W. Thorne and Mrs. Morris Johnston were Martin's passengers during an eight-mile trip and were highly enthusiastic over their first flight. Mr. McCormick made several flights in both machines, and a few other prominent Lake Forest men made flights before the air-yacht party came to a close.

Mr. McCormick was so pleased with his new conveyance that he decided to abandon his motor car and the train in traveling between his home and his office on Michigan avenue for the more pleasant ride over the lake whenever the weather permitted.

On July 30 he made his initial trip from Lake Forest to Grant Park, Chicago, as this city's first air commuter. With Witmer at the wheel, they left Lake Forest at 9:50 a. m. and arrived in Chicago harbor at 10:18, covering the twenty-eight miles in about as many minutes. They made the return trip in the afternoon without lowering the time. The second trip was made the next day, but owing to poor weather conditions, about thirty-five minutes were consumed in getting to the city. However, this compares favorably with train time and it takes two hours for a motor car to travel the distance. Charles G. Dawes, president of the Central Trust Company of Illinois, and Steven MacGordon, of Evanston, will follow the example set by Mr. McCormick by purchasing flying boats immediately.

Glenn L. Martin left Chicago on August 2 to fill an exhibition engagement at Saskatoon, Saskatchewan, with the intention of returning to Chicago shortly after.

At the Cicero field Lillie-Thompson school machines are among the most active. The training of students is going on every day, weather permitting. Four of them passed the license tests on July 18. They were R. G. Sestak, C. J. Schaap, J. P. Pendhayn and N. M. McGuire. All of them used the Wright machine.

DeLloyd Thompson made two flights in his Gnôme motored tractor on July 16, and on the 19th he tested the rebuilt Day tractor; later he took up N. M. McGuire as passenger in his own machine.

W. C. Robinson and William Castori are regularly flying the National Aeroplane Company's machines. Castori is piloting the Beech-National biplane and is in the air almost daily. Robinson, who pilots the National-Nieuport, has been doing some sensational flying during the last few weeks. On July 18 he was in the air four times and his control was exceptionally good. Late in the afternoon of July 22 he went up for endurance and landed after one hour and fifteen minutes of fast flying.

While 4,000 feet over the Chicago loop district on August 1, he discovered a blaze in the fuselage of his machine and for some time he appeared to be in a precarious position; however, he managed to get control of the fire and get back to Cicero safely.

Roy Francis and his parachute jumping outfit, who have been stopping at Cicero, gave a demonstration on August 1. He carried James Irving to a height of 3,000 feet, where the latter was cut loose. Both made safe landings.

Western News

By E. R. Cary.

Robert Fowler is reported to be associated with the Young Aviators at Kansas City, Mo., with whom he was booked before flying the Panama Canal. His engagements at Smith Center, Kans., and Orleans, Neb., last year were under their management.

Mr. W. D. Bowersox, of Colorado Springs, is reported to be progressing nicely in his lessons at Dayton on a Wright machine.

James Ward is reported flying at Mankato in the last week of July.

Ivy Baldwin, who has been flying at Denver's Manhattan Beach, had a spill recently. Besides a wetting, little damage was done. He is expected to help entertain the National Conclave of Knights Templar.

Capt. J. Hector Warden, Moisant pilot, made a 12,000-foot flight at Dewey, Okla., in the presence of 30,000 people. His Gnôme is reported to have worked in its usual faultless manner. One of his flights was of over an hour's duration. He is now booking through Young Aviation Co., Kansas City, who have a string of twenty aviators, employing monoplanes, tractor and thrust biplanes.

Army aviators are now at North Island, across from San Diego, while three officers are reported to be under orders for Hawaii.

Phil. Billiard, in Curtiss copy, recently flew over Topeka, making a splendid landing with engine cut out.

J. A. Bixler, of Hutchinson, Kans., was recently granted a license after two weeks' training on a Wright.

Cessna, the Kansas Blériot copy pilot, seems to have dropped somewhat from the spotlight. Guess his wife made him cut out the "high flying." Our last information was where he flew to church one Sunday.

Two St. Joseph (Mo.) bluecoats are reported building Curtiss copy, equipped with Greer stabiliator (as it is called by its inventor), a pendulum device.

W. D. Robinson, of Pueblo, is working on a reefing device for wings. His idea is to increase control and control speed.

Pennsylvania News

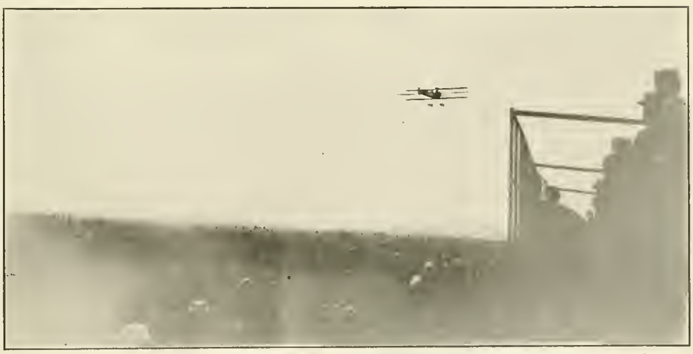
By W. H. Sheahan.

The flying season was formally opened at Eagle Field on July 13th, when Grover Bergdoll took out his Wright machine, which had been carefully overhauled during the previous week, ran it half way across the field and glided into the air to an elevation of over a thousand feet. A remarkable performance when it is considered that Bergdoll has been absent from the field and has done no flying for over half a year.

His daily flights are drawing the old-time crowds and his manoeuvres are even more skillful than when he was flying last season. With a remarkable record of nearly four hundred flights, fully half of which have been with passengers, among the latter being his flight of last year to Atlantic City, over 75 miles, non-stop, and with a reputation as an altitude flyer, all without an accident, is an achievement well worthy of mention and will do much to advance the science.

The Atlantic City flight with a passenger will be made again within a few days, including a trip to Asbury Park, then to Trenton and then down the Delaware River to Philadelphia. His mechanician, Charles Krause, will be his passenger, and should weather conditions be favorable, the entire trip will be attempted in one day.

It is reported that Bergdoll has ordered a 200 h. p. Deperdussin and will compete in the coming Gordon Bennett. Plans are being prepared and bids taken for a factory building to be erected on Eagle Field adjoining the Bergdoll hangar, where all standard type machines and special orders will be built. A training school in both monoplane and



James V. Martin making the first flight at Fairbanks, Alaska, on July 3, 1913, at 10:45 o'clock P. M., with a 60 H. P. Hall-Scott motored tractor biplane. On this occasion thousands of gold miners got their first glimpse of an aeroplane in flight and some of them walked or "mushed" several hundred miles for the occasion.

A group of celebrated airmen. From left to right: Cecil Peoli, Captain Thomas Baldwin and Robert G. Fowler.

biplane will also be run in connection with the same.

A private balloon ascension was made July 9th from the grounds of the Point Breeze Gas Works. R. E. Glendinning, of Chestnut Hill, and Mercer Biddle, of Torresdale, were the aeronauts. An altitude of 8,000 feet was attained and a distance of 60 miles traveled. The balloon was of French make and several ascensions had been made in it from Paris before it was imported to this country.

Arrangements are under way at the present time to have Grover Bergdoll make trial for the American altitude records, pilot alone and with a passenger. On several occasions while flying last summer with his mechanician, Krause, his barograph registered nearly 8,000 feet. Bergdoll is confident that he can easily exceed the new record of 12,575 feet, made by Burnside at Bath, N. Y., on July 26th.

Mr. George Peddle, of Philadelphia, is now occupying part of the new hangar at Eagle Aviation Field with his Blériot, for which, as an example of the finest workmanship and perseverance, Peddle deserves the greatest credit.

Every part of the machine, with the exception of the engine, propeller and tires for the wheels, were made by hand and not a single stock part was purchased. The entire monoplane was built during spare time and it required nearly a year to complete. The machine as seen to-day is as beautifully finished as it is possible to produce and looks as though it had just been imported from the Blériot factory. Several trials have been made and there is every indication that in a short time Peddle will develop into a careful and efficient monoplane pilot. A trial for his pilot's license will be made as soon as he is proficient.

The Peddle machine is an exact copy of the latest product of the French factory, with the exception of original trussing where the foreign mono has shown signs of weakness.

Perry Centennial

Those who took part in the Perry Centennial of Aviation and Aquatic Sports, held at Put-in Bay, Ohio, on Lake Erie, between August 19 and 22, were: Walter Johnson, Thomas flying boat; Beckwith Havens, Curtiss flying boat; Anthony Jannus, Benoist flying boat; Frank Burnside, Thomas hydro-aeroplane; William Blakely, Benoist hydro-aeroplane.

Hammondsport, N. Y.

These are the days of Curtiss greatness. At Hammondsport everything is hurry and bustle to turn out the large number of orders received by the company for flying boats, hydro-aeroplanes, tractor biplanes and motors of the different kinds. What was once a little motorcycle factory conducted by Glenn H. Curtiss and a helper or two has little by little developed into a large manufacturing plant which now employs hundreds of people.

One whole building, in fact, is given over entirely to the office force, in which will be found in different private offices Glenn H. Curtiss, H. C. Genung, Lyman J. Seely and other of America's foremost aeronautical celebrities. Another building is given over almost entirely to the designing force, while still other buildings are used separately as the foundry, wood working, motor building and painting departments, etc., etc.

Mr. Curtiss recently informed the writer that the capacity of the establishment at the present time was one aeroplane a week and that at that particular moment the orders were far in advance of the power to turn the machines out. At the same time Mr. Curtiss gave it out as his opinion that next year should be the banner year for flying boats and that the demand for this particular vehicle for sporting purposes would be surprisingly large; in fact, Mr. Curtiss seemed to be unusually optimistic over the future of the flying boat industry.

The past month was an especially busy one at the Curtiss flying camp.

H. P. Harris, of San Francisco; Elwood Doherty, of Buffalo; Steve MacGordon, of Chicago, and William Thaw, of New York, flew for their licenses, Harris on the hydro-aeroplane, and all of the others with the flying boats. MacGordon bought the second of the latest model Curtiss flying boats. These are very similar to those supplied to Jack Vilas and J. B. R. Verplanck, each of which craft has some noteworthy performances to its credit. The new ones, however, are made of mahogany and cedar, natural finish. They are very handsome, and also somewhat lighter than the preceding series. MacGordon and Thaw expect to spend some part of the summer at Newport. Gerald Hanley, of Providence, R. I., had the first of the new boats. He had no time to join the class here and his instruction is being cared for by Raymond Morris. Frank Thalman, of Chicago, and L. D. Smith, of Boston, are showing excellent progress with the hydro-aeroplane. Instructor Callan reports that he is about ready to turn them over to the tender mercies of the Aero Club of America's official observer. Parenthetically, it may be observed that "Lanny" Callan expects to break his rule this month and fly a hydro date at his home town, Albany, N. Y., during the Elks' Carnival. Time will hang heavy on his hands that day, for Lanny is accustomed to putting in five to seven flying hours a day, which an hour of exhibition work will scarcely offset. There is a new set of faces at the school this month, among them Vinton Pierce, of New York; Mortimer Bates, of New York; Z. T. Barnes, of San Francisco, and F. D. Lawrence, of Rockford, Ill. Bates already holds a license for the Blériot, but came to the conclusion there would be more opportunity the next few years for Curtiss flying boat operators. Among the "millionaire sportsmen" (that seems to be the popular title for any purchaser of a flying boat) who are being instructed in the operation of the new machines are George U. von Utassy, of New York; William E. Scripps, of Detroit, and Barton L. Peck, of Detroit. Mr. Peck had a few lessons from Beckwith Havens while "Becky" was in Detroit, but expects to come to Hammondsport to complete the work. Mr. von Utassy spent a little time at the Hammondsport camp, and his instruction is being continued near New York City by J. A. D. McCurdy. Mr. Scripps is already an accomplished water-flyer and after a few flights with Havens he had no difficulty in mastering the Curtiss controls. Another year at this rate and we should have more accomplished amateur water-flyers in the country than there are skippers of fast hydroplanes. Then we shall see inaugurated some racing that will lend a new meaning to the word.

The Curtiss Aeroplane Company has recently gotten out a new catalogue which in richness of design and quality will compare favorably with catalogues being gotten out by much larger and older concerns in other industries. It is entirely given over to a description of the flying boat and should prove most interesting and instructive reading matter for anyone who is interested in the development of flying in this country. One of these catalogues may be had for the asking.

On August 5th Beckwith Havens flew in a Curtiss flying boat from the Country Club, north of Detroit, 14 miles across the city of Detroit and finished a flight of 71 miles to Toledo in 65 minutes.

Bath, N. Y.

On July 26, Frank Burnside ascended to a height of 12,950 feet at Bath, N. Y., in a Thomas standard biplane with Curtiss O. X. 90-100 h. p. motor, and while this flight was higher than the previous American height record by a few feet, still, according to the rules of the International Aeronautic Federation, whereby in order to create a new record one must beat the old record by over 50 metres, Mr. Burnside was not officially credited with a record, but expects, however, to go out for the altitude record again, in which case he says he will go so high that there will be no question concerning the record.

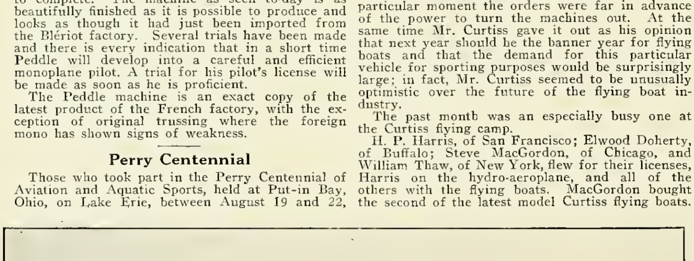
The flight was begun at 4:29 o'clock and completed at 6:15 o'clock, time in the air being 1 hour 46 minutes.

Mr. Burnside is from Oneonta, N. Y., and has been connected with the Thomas School for several months, during which time he has made many brilliant flights. Mr. T. M. Stewart, the well-known barograph manufacturer, claims that the barograph did not register with 1,500 or 2,000 feet of the actual altitude reached by Mr. Burnside. This, he said, was due to the fact that the ink used was very heavy. It was ink commonly used for rubber stamping outfits, as the proper barograph ink could not be procured in Bath.

There have been great activities at the Thomas Brothers School during the past month. All of the students are making short flights, while the regular staff of Thomas aviators are kept busy filling exhibition engagements around the country.

Mr. Fred Eells completed a very successful three weeks' engagement at Irondequoit Bay. Mr. Ralph Brown gave a two weeks' exhibition with one of the Thomas hydro-aeroplanes at Springfield, Mass., while Walter Johnson has been carrying numerous passengers daily over Conesus Lake, which netted the company quite a large sum of money.

Messrs. Johnson, Burnside and Eells went to Put-in Bay August 16th to make ready for the Perry's Victory Centennial Celebration August 19-22. Mr. Johnson used a new Thomas flying boat equipped with a 90 h. p. Austro-Daimler motor, while Messrs. Burnside and Eells flew the Thomas standard hydro-aeroplane equipped with a Curtiss O. X. motor. A 70 h. p. Kirkham motor was also taken along as a reserve motor.



An "Alco" hydro-aeroplane, built by Allan and Malcolm Lougheed of San Francisco.

Among the promising young students who are making good headway at the Thomas School is Mr. S. H. Sharp, of Hymera, Ind. This young man promises to turn out to be a most skillful aviator unless all present signs fail.

Mr. C. M. Cox, who is the business manager of the Thomas Brothers Aeroplane Company, is one of the most enterprising young men in the business. He is constantly on the alert and always ready to take advantage of opportunities. It is owing to his hustling ability that the large corps of Thomas aviators are kept busy filling exhibition dates and that the Thomas flying boats, hydro-aeroplanes and tractor biplanes are being sold in many parts of the country. Mr. Cox is preparing some big plans for the advancement of the Thomas Brothers Aeroplane Company in the near future.

Mr. William T. Thomas, who is the president and chief engineer of the company, is, of course, responsible for the excellent showing made by the Thomas machines up to the present time and he is also designing some new machines which are expected to create quite a surprise in the aeronautical movement within the next few months.

Mr. Oliver W. Thomas, vice-president and treasurer of the company, has been in Europe for the past month visiting all the best European concerns for the purpose of bringing back and utilizing in the Thomas concern the very best and latest of European ideas in aeroplane design and construction.

Cicero

The month of July was a lively month at Cicero. Besides the old crowd of flyers, the field has been visited by several California flyers of national reputation, such as Roy Francis, Barlow, Dougherty, Seelander and others, all of whom have been doing some very good flying. The Lillie School has been busy all month, and besides turning out six licensed pilots, have eight more ready to go for their tests as soon as the weather is suitable. The month of August will be the last month for the Lillie School, the exhibition season starts in September, and both Thompson and Lillie, the teachers in the school, are booked solid for exhibitions for several months after that date. They are using the famous Day tractors for exhibition work, equipped with Kirkham motors, one forty and one fifty horsepower. Thompson and Lillie, who are both holders of superior licenses, claim that the Day tractors are the only real flying machines for good exhibition work.

La Gaucier is still building on his transatlantic boat and expects to try it out the latter part of September. W. C. Robinson is flying his Nieuport monoplane faithfully and expects to do some exhibition work in the late fall.

The famous McCormick umbrella machine had another smashup in the hands of Lillie, but this time it was in the lake and no danger to the aviator. It is being rebuilt again and they expect to have it ready about the middle of August.

Aeroplane for Lake Hopatcong

A committee has been appointed by the residents of Lake Hopatcong, N. J., to make arrangements for a hydro-aeroplane to be used upon the lake for passenger carrying work and as a general attraction for the resort in the future.

The committee consists of Mr. Hudson Maxim, president of the Lake Hopatcong Park Commission; Mr. Richard J. Chaplin, Mayor of Mount Arlington, and Mr. G. Frank Cope, proprietor of the New Breslin Hotel.

St. Louis

Activities in aeroplaning in and around St. Louis during the past month have been confined almost entirely to the Benoist flyers. Most of the Benoist flyers, however, are kept busy with exhibition contracts and only return to St. Louis occasionally for local work. One machine is kept busy making flights along the Mississippi River for demonstration purposes.

George Barmeier, T. S. Duby, Earl Wymark and Roger Jannus are now about ready to take their pilot licenses.

Mr. W. D. Jones, of Duluth, Minn., was one of the first to own a flying boat and operate it on the Great Lakes. This is a Benoist flying boat and was delivered to him some time ago and after a month of training Mr. Jones has become a very proficient flyer. Mr. Jones purchased the flying boat for sporting purposes and has given several exhibitions at motor boat regattas.

Dayton, Ohio

Considerable activity prevails at the Wright School at Simms Station. Each day Mr. Oscar Brindley is out with his students, coaching them in the fine art of flying. So far Mr. Brindley has been getting extremely good work out of the students and in one case Mr. Bernard Whelan, after operating the machine eight days, flew alone with perfect control.

Some of the other students who recently graduated are: Maurice Priest of St. Louis, Mo.; John A. Bixler, of Hutchinson, Kan.; Augustus A. Bressman, of Omaha, Neb.; Maurice T.

The Rheinische aero-works referred to in Mr. Robert Kemp's letter on page 155.

Schermerhorn, of Greenwich Village, Mass.; R. M. Wright, of Washington, Ind., and W. E. Bowersox, of Colorado Springs, Colo.

A series of experiments on the Model six-cylinder, 60 H. P. motor, valve mechanism, has brought about great improvement and in recent block tests a steady delivery by this motor of 67 H. P. at 1530 R. P. M. was given. This for a motor weight (less flywheel and sprockets) of 235 pounds, puts this motor in the leading rank of water cooled engines.

A new arrival at the Wright plant is Grover Cleveland Loening, who has become the engineer of the Wright Company and will take up a permanent residence in Dayton.

Emaillite now sold in America

Emaillite is a liquid solution which is applied to the fabric of aeroplanes after this fabric has been fastened to the wings and surfaces and it is now distributed in this country by the American Emaillite Company of Chicago.

Emaillite is generally used on unbleached Irish linen as this fabric is not only stronger, weight for weight, than cotton, but is much less affected by changes in temperature and humidity and is therefore not tight one day and baggy the next, according to the makers. It is applied with a brush to this linen after it has been straightened on the aeroplane surfaces only tight enough to take out all creases and wrinkles. It is claimed that there is no initial strain on the sewing, tacks or wood skeleton and that during the drying process the fabric shrinks evenly and in all directions until the cloth has assumed a proper stretch and is uniformly and evenly taut.

Among its other advantages claimed by the makers are the following: It makes the fabric rain and moisture proof; it is not affected by oil or gasoline; it increases the tensile strength of the fabric; it increases the rigidity and strength of the surfaces; it is easy to apply and can be washed with soap and water; it is non-inflammable.

For those who are further interested in the subject it might be well to write to the American Emaillite Company for more particulars.

At the Burgess plant there has been considerable activity going on during the past month, for in addition to constsructing numerous machines and the new military Burgess, trials have been going on with the new 200 H. P. Anzani motored flying boat constructed for Robert J. Collier. Several tests have been made by Mr. Coffyn with this machine and as soon as the motor is tuned up properly it should create quite a bit of a sensation, for it is the most powerful craft of its kind in the country to-day.

Hall-Scott Motor Performing Well in Alaska

At Fairbanks, Alaska, James V. Martin in his 60 H. P. Hall-Scott motored tractor biplane recently made what are stated to be the first flights ever accomplished in Alaska. Thanks to the splendid performance of his Hall-Scott motor Mr. Martin was able to surmount several difficult obstacles and to fill his contract with complete success. An illustration of the Martin tractor is shown on this page.

That the new 100 H. P. Hall-Scott motor is upholding the reputation which the Hall-Scott motors have enjoyed for reliability and power, has been proven in the case of the Christofferson flying boat which is fitted with the first of the new motors. To see the Christofferson flying boat in operation propelled by this motor one would never believe that the wings were supporting the large boat bull of the craft, for so quickly does it rise and so easily does it fly that one would imagine the machine was a lightweight high powered aeroplane rather than a big heavy flying boat.

A. J. Engels, the Cleveland aviator, flew at Ashtabula Harbor on July 28th in his 80 H. P. Curtiss hydro-aeroplane and entertained the crowd with some splendid flying.

Two Flying Boats Stationed at the Detroit Motor Boat Club

Commodore William E. Scripps and Martin L. Peck, both of Detroit, have each purchased one of the latest type Curtiss flying boats and will station them at the Detroit Motor Boat Club where in races and pleasure flights they will show the other boat club members how slow and old-fashioned they are with their chug-chugging motor boats and make them realize that if they want to know what water sport really is they will have to acquire modern flying boats.

Commodore Scripps, who is a power in the motor boat world and the builder of the Scripps marine engines, operated a Sturtevant motored Burgess twin float hydro-aeroplane all during last year without the slightest accident and became so enthusiastic over the new sport that it was only natural when the flying boats demonstrated their worth that he would be one of the first to purchase one of the new craft. When a man of such wide experience in water sports and water conditions as Mr. Scripps takes to water flying and after one year of active participation in the new sport is more enthusiastic over it than ever, there cannot be any question as to the future of this fascinating pastime which is bound to surpass motor boating and yachting.

Goodyear Banquets Winners of Balloon Race

R. H. Upson, pilot of the balloon "Goodyear," which won the National Elimination Race at Kansas City, July 4th, was presented with the Kansas City Trophy Cup at a banquet given by the Aero Club of The Goodyear Tire & Rubber Company, at the Portage Hotel, Akron, Ohio, Friday evening, July 25th.

The banquet was limited to members of the Aero Club and a few invited guests, totaling in all, seventy-five.

Mr. Upson and Mr. R. A. D. Preston, aide, will sail for Europe shortly, where they will represent America in the Gordon-Bennett Cup race.

Christofferson Flies at Seattle

During the latter part of July Silas Christofferson was flying his 100 H. P. Hall-Scott motored flying boat at Lake Washington, Seattle. The dexterity with which the big craft was handled, thanks to its powerful motor and efficient design, was the marvel of all and proves that flying boats can be made to fly as efficiently as land aeroplanes, if given a reliable and powerful motor.

New Corporations Formed

G. S. A. Aviation Company, Inc., Hornell, N. Y. To manufacture and exploit aerial machines, etc. Capital, $10,000. Incorporators: Clinton Gray, 222 Main street; George A. Salzman, 28 W. Genesee street, and Harry L. Allen, 27 Armory place, all of Hornell, N. Y.

Heinrich Aeroplane Company, Inc., Baldwin, L. I., N. Y. Capital, $15,000. Incorporators: Arthur O. Heinrich and Albert S. Heinrich, both of Baldwin, N. Y., and Henry C. Karpen, 584 Broadway, Brooklyn, N. Y.

The Flying Association, Inc., New York City. To manufacture and exploit aerial craft and to conduct a general publishing business in connection therewith. Capital, $30,000. Incorporators: Thomas A. Stoddart and Arthur C. Beck, both of 2 Rector street, New York City, and David Kaess, 11 Broadway, New York City.

International Aerial Company, Boston, Mass. Capital, $50,000. Directors and officers: G. Colucci, president, Boston, Mass.; Carlo F. Arzillo, treasurer, 151 Richmond street, Boston, Mass., and S. J. Lager, Boston, Mass.

The Atwater Safety Flying Machine Company, Akron, Ohio. Capital, $25,000. Incorporators: M. L. Atwater and Joy Atwater, both of Akron, Ohio.

Aero Sales Company, Inc., Springfield, Mass. Capital, $50,000. Directors and officers: George Ulrich, president and treasurer, Hartford, Conn.; C. H. Sughrue and J. J. Tanzy, both of Springfield, Mass.

Itala Aeroplane Company, Inc., New York, N. Y. Capital, $100,000. Incorporators: Rubino Plastino, 49 Maiden Lane, New York, N. Y.; Arthur B. La Far and George R. Cooper, both of 80 Maiden Lane, New York, N. Y.

Kantner Goes to Europe

Harold Kantner, the splendid young Moisant aviator who designed the Kantner-Moisant monoplane which recently was flown by Murvin Wood from New York to Washington, is now in Europe training on speed monoplanes for the purpose of entering the coming Gordon Bennett Cup Race as a representative of America.

While the American nominations for the race have not yet been made public, it is generally believed that the two representatives will be Charles T. Weymann and Harold Kantner.

New Lateral Control for Aeroplanes

Mr. John W. Wilson, of Boston, Mass., one of the first members of the Aeronautical Society of New York and a member of the Aeronautical Society of Great Britain, has invented and patented in all important countries of the world a new method for maintaining lateral control of aeroplanes, and in a recent interview he had the following to say in reference to it:

"I have long realized that an aeroplane, like a bird, is in effect, a single track vehicle, calling for absolute alignment, and that at no time should the center of pressure be so altered as to constitute a drag for the purpose of restoring lateral balance. It is well known that the systems of ailerons and wing warping are both ineffective unless the aeroplane maintains a forward motion, and once stalled in the air, there is always grave danger that the aeroplane may never again be righted. The Wilson device, depending upon no drag of any kind, allows of an instant change of support by the turning of the entire supporting plane, the banking side of the plane moving on an axis oblique to the perpendicular, forward, upward, and inward, while the opposite side moves backward, downward and inward, and at the same time the weight carrying body, having thus been thrown out of line, automatically adjusts itself back into line. This rearrangement of the four incidences—support, pressure, gravity and thrust—is accomplished without the use of either vertical or horizontal rudders, without either ailerons or wing warping, without changing the center of pressure or slacking speed, a combination of advantages which also allows of slower speed landings, owing to the instant readjustment of the center of support and aids in reducing the dangers of aeroplaning to a minimum.

"This device, embodying in its operations an oscillating movement of the planes, without interfering with the forward motion, closely approximates bird flight under certain conditions which have been noted and described by close students of aviation. I am of the opinion that my device in another form with which I am experimenting will, in the near future, render possible safe aerial flight without the use of a propeller."

Those interested no doubt can obtain further details by communicating with Mr. John W. Wilson, 95 Court street, Boston, Mass.

New York-Washington Flight

On Friday, August 8, C. Murvin Wood left the Hempstead Plains Aviation Field, near Garden City, L. I., in the Kantner-Moisant monoplane at 4:30 A. M. and flew to Gaithersburg, Md., a few miles from his objective point—Fort Myer, Va.—just outside of Washington, D. C., where he landed at 9:31 A. M. The total distance flown by Mr. Wood in this trip was 267 miles, his total time in the air being 5 hours 01 minute. An altitude of 7,350 feet was reached at times during the flight. Later on in the day he resumed his flight and finally made a splendid landing on the Parade Grounds at Fort Myer.

The object of the trip was to demonstrate the ability of the aeroplane to the government officials as a speedy dispatch carrier in case of war, and in order to bring out the point strongly Mr. Wood raced with a special Pennsylvania Railroad train, which he outran during the flight.

During the trip Mr. Wood had considerable difficulty in keeping his 50 h. p. Gnôme motor in running order, and in fact, finally had to come down owing to engine trouble. It is too bad that in a race of this kind an 80 or 100 h. p. engine was not installed for the purpose, as the new Kantner-Moisant machine, which we described in the August, 1913, number of AIRCRAFT, pages 140 and 141, would have given far greater speed and also shown up to much greater advantage in every way. The flight, however, was a great success, notwithstanding, and later on Mr. Wood gave several educational demonstrations to the army officials at Fort Myer.

Correspondence

Paris, July 10, 1913.

Dear Mr. Lawson:

Enclosed is P. O. order for $9.00 against which please send me Vol. III of AIRCRAFT bound like the first two I have and prolong my subscription another year. I have the separate copies of Vol. III, but want fresh copies in the bound volume.

Aeronautics here are assuming more and more a military aspect and thus the necessity of being ever armed to the teeth gives European countries a tremendous advantage over America in the development and progress of the movement.

France has at last woken up to the potency of the German airship and to her will, I think, belong the credit of building the first thousand-horse-power aircraft. These should go close on, if not quite, fifty m. p. h. Germany is turning some attention to the weakest points in her airships; docking and traveling at great altitudes; every few weeks mark some progress.

I doubt if Congress will really wake up in the matter, however, until the possibility of a Yokohama-Panama raid becomes imminent (further than crossing the Atlantic, but easier, because of the many island harbors where nautical air-cruisers could take on fuel, gas, etc., from their convoys).

Outside of military aeronautics, water flying is the only thing that at this time can keep the movement alive, and there is a better chance of the motor-boat element turning to this in America than in Europe; there is, however, *enormous* development along this line here because of its naval aspect.

I would like to see AIRCRAFT booming the foundation of an aerodynamical laboratory in America; it may not profit the industrial side immediately, but, directly it is an accomplished fact, aeronautics will be taken far more seriously in America than they have been so far.

Very sincerely,
G. F. CAMPBELL WOOD.

New York, Feb. 28, 1913.

To the Editor of "Aircraft."

According to various books on aeronautics a motor and propeller developing a thrust of only 200 pounds can lift an aeroplane weighing 1,000 pounds. In other words, it is possible to create an effect of 1,000 pounds with a cause of only 200 pounds.

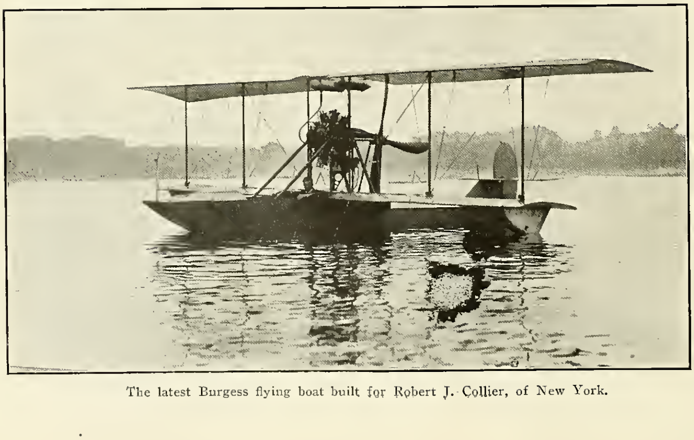
This seems to me to be "perpetual motion," but I evidently must be mistaken, as "perpetual motion" is impossible, and the aeroplane is in actual operation; so I would kindly ask you to show me why my impression is incorrect. Please note, however, that I do not consider "the resistance of the air" nor the "angle of the plane" an adequate explanation.

A prompt reply, by mail if possible, will be appreciated by yours truly,

BENJAMIN FRIEDBERGER.

THE BURGESS FLYING BOAT BUILT FOR ROBERT J. COLLIER

By F. H. RUSSELL



The latest Burgess flying boat built for Robert J. Collier, of New York.

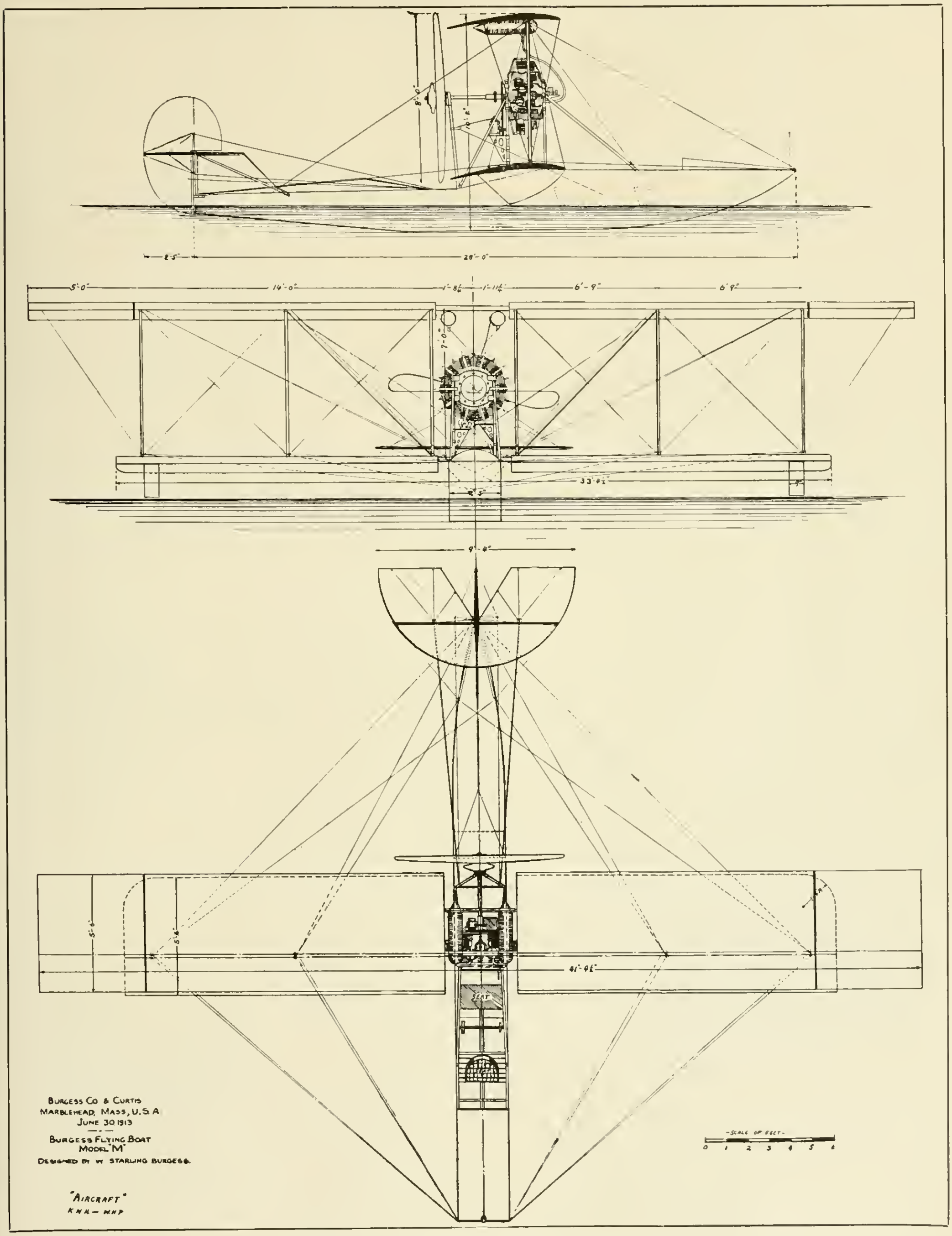
Late in the spring Mr. Robert J. Collier placed an order with the Burgess Company and Curtis for a flying boat, and at the same time purchased a 220 H. P. 20-cylinder Anzani motor from the Anzani Company in France. It was specified that the flying boat should make a speed of at least 75 miles per hour, should carry a fuel capacity of about 4 hours flying and carry one or two passengers.

The boat was completed the latter part of July and has been flown successfully a number of times by Frank T. Coffyn, who likes it so well that he has taken a contract with Mr. Collier to continue to fly it for him. The motor is started by a Hartford Electric Self Starter, weighing 137 pounds.

It will be noticed from the plans that the upper plane alone warps, the lower planes being rigid and are separated by a single line of steel struts. This is a distinct departure in American design which gives a greater efficiency by a marked reduction of the head resistance.

General specifications are as follows: Spread of upper wing, 41 feet, 4½ inches; spread of lower wing, 33 feet, 4½ inches; depth of wing, 5 feet, 6 inches each; gap 6 feet, 8½ inches; area supporting surface, 373 square feet; length over all, 30 feet, 6 inches; length of hull, 28 feet; height, 10 feet, 2 inches; power plant, Anzani motor; total weight of power plant, 968 pounds; total weight, net, of machine, 2,000 pounds; propeller, Burgess type, diameter 8 feet each; propeller, pitch, 7 feet, 9 inches; propeller, four blades.

SCALE DRAWINGS OF THE BURGESS FLYING BOAT BUILT FOR R. J. COLLIER



Side, Front and Top View Drawings of the Burgess Model "M" Flying Boat which is fitted with a 20-Cylinder, 220-H. P. Anzani Motor

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FOR SALE—Dirigible airship outfit; ship about 45 feet long; Curtiss 7½ H. P. engine; will carry 300 to 400 lbs.; brand new tent worth nearly the money for the whole; $400 gets the outfit complete. G. P. Browne, Anderson, S. C.

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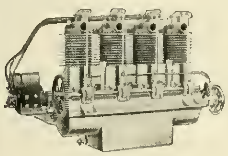

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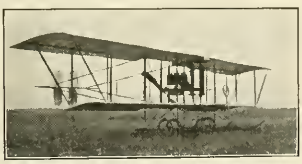

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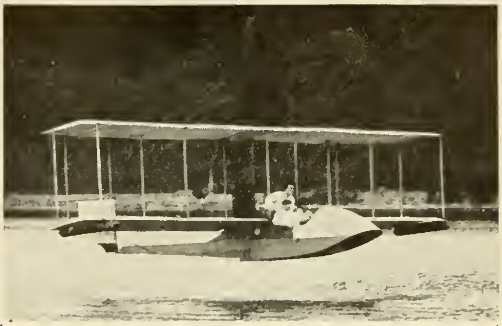

Antony Jannus, with two passengers, flying the new Benoist Flying Boat, equipped with six-cylinder

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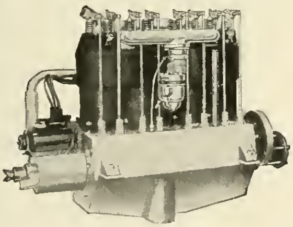

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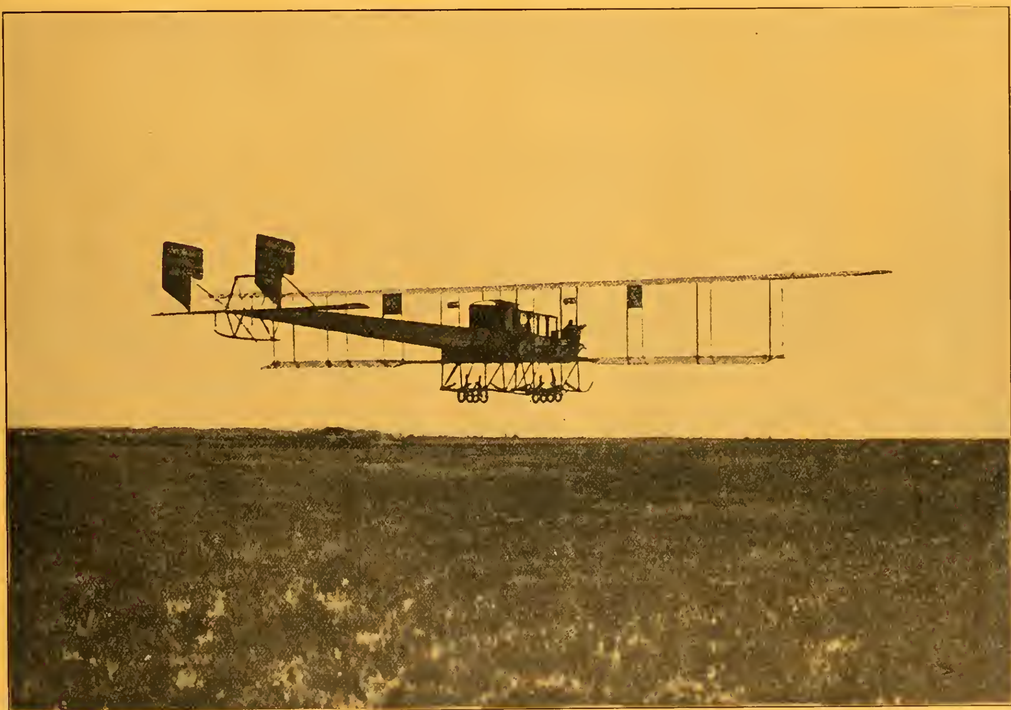

AEROPLANES GROWING IN SIZE

The Mammoth Sikorsky Biplane in flight near St. Petersburg, Russia. This aeroplane is nearly 100 feet wide, has an enclosed cabin and carries ten passengers.

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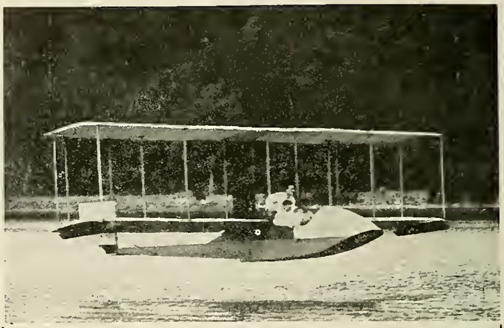

Antony Jannus, with two passengers, flying the new Benoist Flying Boat, equipped with six-cylinder

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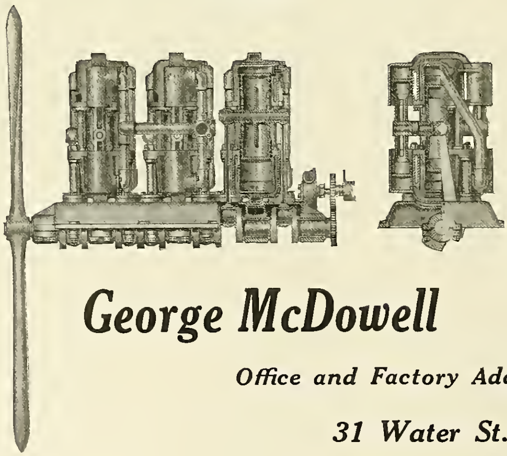

George McDowell

Office and Factory Address

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The remarkable aeroplane shown above is the invention of M. Sikorsky, a clever young Russian, who is only 23 years of age. His father, a famous surgeon of Kieff, Russia, although very wealthy, was from the beginning opposed to his son experimenting with aeroplanes. Nevertheless, his sister was interested in his work and aided him financially at the start of his experiments in 1908. His subsequent successes demonstrated his worth as a designer and builder and he finally gained the aid of the Russian government as well as his father and a number of friends.

His first machine was a headless biplane something on the order of a Goupy, and this was followed with other experimental machines of both the monoplane and biplane types. Sikorsky also went to France and studied the then existing successful machines with the result that when he returned to Russia he had formed his own ideas on aeroplane design and construction and before long he was constructing very successful machines. His small standard type military tractor is to-day one of the leading machines in Russia.

From experience gained in building his other machines, Sikorsky believed that a mammoth enclosed cabin aeroplane could be constructed and successfully flown and so in collaboration with his chief pilot and others of his staff, the giant biplane here illustrated was evolved. The fact that this machine now holds the world's record for flight with seven passengers and has accomplished numerous trips with eight and more passengers aboard proves that Sikorsky's faith in the possibilities of a large passenger-carrying aeroplane was not misplaced. This machine has four motors of 100 H. P. each, driving four separate propellers. The span of the top wing measures 90 feet and the lower wing about 75 feet. It was built at the Russian government's Baltisky gun factory. Flying with five passengers and an additional load of 1,500 lbs. to test its carrying capacity, this machine attained a speed of 100 kiloms. (62 miles) an hour.

CONTENTS—OCTOBER, 1913

AIRCRAFT

ALFRED W. LAWSON
President and Treasurer
ERNEST C. LANDGRAF
Secretary

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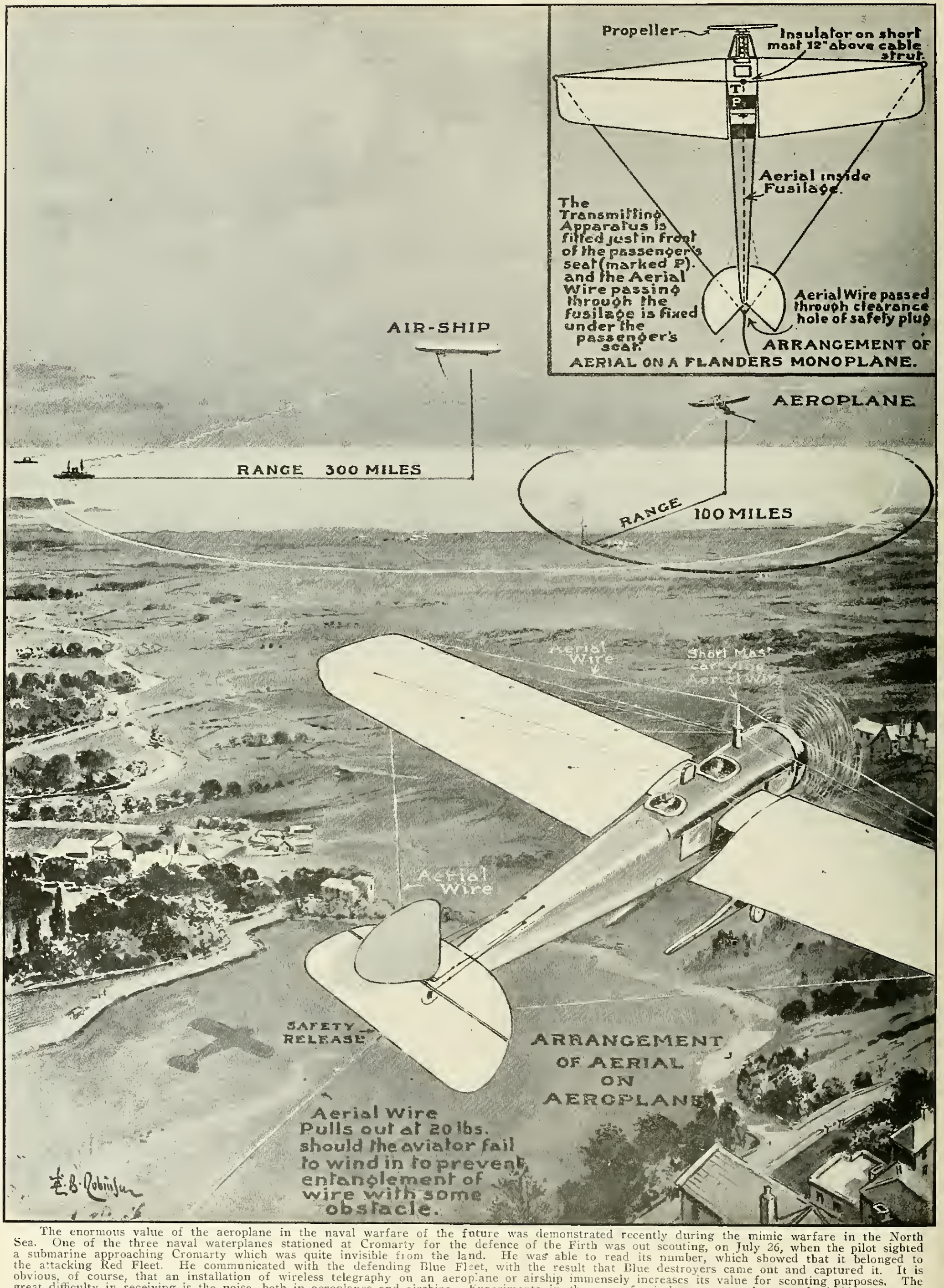
CHECK TO THE SUBMARINE: AIR-SCOUTING WITH WIRELESS



The enormous value of the aeroplane in the naval warfare of the future was demonstrated recently during the mimic warfare in the North Sea. One of the three naval waterplanes stationed at Cromarty for the defence of the Firth was out scouting, on July 26, when the pilot sighted a submarine approaching Cromarty which was quite invisible from the land. He was able to read its number, which showed that it belonged to the attacking Red Fleet. He communicated with the defending Blue Fleet, with the result that Blue destroyers came out and captured it. It is obvious, of course, that an installation of wireless telegraphy on an aeroplane or airship immensely increases its value for scouting purposes. The great difficulty in receiving is the noise, both in aeroplanes and airships. Experiments in the use of wireless on aeroplanes and airships are now being made by the Marconi Company. A wireless station of 1½ k. w. (about 3 h. p.) on an airship has a 300 mile range. The weight of the station on board, excluding the generator, but including the transmitter and receiver, is 293 lbs. The weight of the generator is also 293 lbs. An installation on an aeroplane has a range of 100 miles. It consists of a small and very compact station. The weight of the station, transmitter, and receiver is 96 lbs. Drawn by W. B. Robinson for the London Illustrated News.

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LEARNING TO FLY

(THIRD ARTICLE)

By ALFRED W. LAWSON

LESSON 5.—CIRCULAR FLIGHTS.

AS soon as the student has become more or less proficient in making short straightaway flights, he is then permitted to make circular flights.

A circular flight, as John Guy Gilpatric puts it, "is only a long straightaway flight with a bend in it," but as soon as the student undertakes to make a bend he immediately discovers that his real flying lessons have begun, for in making the bend or turn every control must be brought into play in order to keep the machine properly balanced.

The ordinary aeroplane in flight is practically nothing more or less than a large surface balanced on a single point and capable of falling over in any direction or swerving around and which is only kept from doing so by the operation of the controls.

Of course, an aeroplane in flight, owing to the distribution of the support on the planes and tail, has a certain amount of natural stability in calm weather, but even under these conditions the mere act of moving the controls to steer to the right or left, tends to throw it out of balance and the skill of the operator is relied upon to bring the machine back to its equilibrium.

On the other hand, the distribution of the main planes and tail planes on an ordinary aeroplane, while to a certain degree imparting equilibrium to the craft, at the same time are the very means of causing the machine to pitch and rock in gusty weather, for the broad span of the main planes cause them to be affected by side gusts, for the reason that one wing can receive a greater pressure than the other and cause the machine to tip over, and as there is no natural corrective stability in the wings themselves but only a natural tendency to disturb the balance with each gust and current of wind, the aviator must use his controls to counteract these disturbances; thus the pilot of an ordinary aeroplane is continually forced to fight against the balance disturbing qualities of the usual aeroplane wing. The same applies to the fore and aft stability of a machine, for in gusty weather the tail, while somewhat steadying the machine, may at the same time, be the very means of disturbing its balance, for it is likely to be pushed up or down by wind currents and as there is practically no fore and aft support in the main planes themselves, the machine is always likely to either tip downward or climb upward, and here again the aviator's skill is required to restore the balance by the use of the elevator.

In making my first turn, I more than ever realized that the machine was practically balanced on a pivot, for at the same time that I used the rudder to turn the machine there was an instantaneous movement of the machine to nose upward while at the same time the wings shifted from the horizontal to an oblique position. Therefore, I found it necessary to correct these movements by bringing into simultaneous play both the elevator and the warp; the elevator to nose the machine down and thus retain the forward speed to keep the machine from stalling, and also warping slightly to the high side of the machine so as not to get into too steep a bank during my first lessons in turning.

I shall probably never forget the first circle I made in an aeroplane. It was certainly a scorcher, for a beginner. I had been given instructions to take the machine to a certain point at one side of the aviation field about a mile and a half distant and then turn to the left and gradually swing around and come back and land at the starting point, the whole trip to cover about four miles.

It was a new Sloane-Deperdussin machine that I got into—that is to say, an old machine rejuvenated and put in excellent condition, and the motor was pulling it at about 50 miles an hour—therefore the controls were a little more sensitive than those I had been accustomed to. In starting out the machine climbed fast and before I was aware of it I was between 200 and 300 feet high. The higher I went the slower the machine seemed to be going, which, by the way, was apparent to myself alone, for, as every aviator knows, the higher you get from the ground the less you notice the speed as your range of vision is broadened; it is like riding on a railroad train, when you look off a great distance the train seems to be going slow, whereas if you centre your gaze on the ground over which you are traveling you seem to be going very fast.

Anyway, I started to make the turn as directed, but the first thing I knew I was outside of the aviation field altogether and flying over farms, farm houses, barns, trees, railroads, etc., at a great rate. I looked over to the spot where I was supposed to land and I found that I was at least a mile to the right of it and no possibility of getting back into the grounds, so I decided to make a larger circle on the outside of the grounds and get back from the opposite direction. Below me was the Long Island railroad tracks and I noticed in front of me about three miles away a freight train which came thundering along in my direction. There was a considerable drift to the right which kept me directly over the railroad track for at least two minutes and as I was traveling at the rate of 50 miles an hour and the railroad train was traveling at about 25 miles an hour, those two minutes were all the time necessary to bring us almost together, but just before we came up to one another I managed to turn the aeroplane at right angles and away from the path of the onrushing train. Then I had an opportunity of viewing with composure the great panorama which spread out before me as a most fascinating sight—a sight for the gods and aviators sure enough.

I never felt better satisfied with myself and life generally than

on this occasion although I realized that my instructor must be jumping mad at the performance I was giving. Little by little I steered the machine around until I got it back over the field again and in line with the landing place when I brought it down to the ground after observing a most remarkable series of gesticulations on the part of my teacher who afterwards informed me that my flight had added several years to his life and numerous grey hairs to his head.

While in the air, as stated before, the machine did not seem to be making much speed, but as I neared the ground it appeared to go faster than any express train I had ever traveled on, but I managed to make a good landing, although about a quarter of a mile away from the spot which the instructor had requested me to land upon. I covered about eight miles altogether and was in the air about ten or twelve minutes.

After that experience I felt that I was capable of doing almost anything in the shape of piloting an aeroplane, although my instructor was far from sharing my optimistic views on that point.

LESSON 6—FIGURE EIGHTS

It is the usual custom at aviation schools to have the student make his first circles to the left, it being the general opinion that right circles are more difficult to perform on monoplanes fitted with rotary motors owing to the fact that the swinging of the motor and the propeller to the right tends to tip the machine over in this direction if sharp turns are made and are not prepared for and counteracted by the pilot with his control. There is a theory that there is a slight gyroscopic effect set up in making sharp right turns with a revolving motor which tends to tip the machine to the right and at the same time point its nose up, which is the very thing which should never be allowed to occur on a turn, as this will tend to stall the machine just at the time when the most control is needed to counteract this tipping, and hence it is always advisable especially in making right turns to dive the machine which thus increases its speed and consequently the sensitiveness of the controls.

Personally I found that the right circle was just as easy to accomplish as the left, probably owing to the fact that I made it very big and at a slightly descending angle so that I did not feel the tipping effects of the revolving motor which only occurs with very sharp turns, but even then I am informed there is no serious danger from this source if the speed is kept up and the wings warped to restore the balance if the machine threatens to tip too much.

By making all my turns at the beginning very large and then gradually cutting them finer, I learnt to make turns in either direction with equal facility, and if the proper precautions are taken I can see no difference whatsoever in making either right or left circles.

In order to become a first class flyer, of course the student must learn gradually and must not attempt to make sharp turns the first time or two until he has practised making long ones and has become accustomed to the banking of the machine, which is somewhat alarming the first time.

After the student has practised circles a short time and is capable of making turns in either direction, he is then ordered to make a figure eight, which is simply two circles executed in different directions. In making these figure eights usually two men are stationed about half a mile apart and the student flies around one of them with a left turn and around the other with a right turn and crossing his own line of flight between the two.

My first figure eight was made on the 50 H. P. Gnôme motored Moisant-Blériot monoplane and my instructor was Mr. C. Murvin Wood, the chief pilot of the Moisant Aviation School and the man who recently flew from New York to Washington. While I did not cover quite as much territory in making my first figure eight as I did in making my first circle, at the same time when I completed it, Mr. Wood jocularly enquired if I had undertaken to break any cross-country records during the flight.

After the first figure eight, however, I managed to reduce the space required for the turns until my circles were reduced to moderately reasonable dimensions. In making short turns I was, of course, called upon to do some banking, in which at times the machine appeared to me to be sliding over sideways, but with each succeeding turn in which I banked the machine I became more accustomed to it and found that it was part of the art of flying.

One of the most important things for the beginner to remember in making his first turns, especially if they are fairly short, is that he should stay at an altitude of at least 200 feet, and this is one of the hardest things for a beginner who is the least bit timid to bring himself to do because he naturally realizes that turns are somewhat more dangerous than straightaway flights and for this reason he feels that he ought to stay near the ground so that he will not have far to fall if the machine does slide to the ground. Such reasoning, however, is a mistake because this very flying near the ground which he reasons will add to his safety in fact really adds greatly to his danger, for the reason that if he is struck by slight wind puffs or makes a false move and the machine tips or dives, he has not sufficient space in which to correct the balance and straighten it out and hits the ground with a crash in which he is lucky to escape without injury. On the other hand if the pupil is flying at a fair height and is struck by a gust or makes a false swerve and the machine starts to fall, he has both time and space in which to operate his controls and restore the balance.

TESTING THE TANDEM

By ALBERT ADAMS MERRILL

IN the August number of AIRCRAFT I explained the theory which accounts for the longitudinal stability of converging tandem surfaces. Pure theory and laboratory tests show that the converging tandem will prevent stalling, which is a very common cause of accidents to mono- and bi-planes. Eiffel has something to say upon the tandem. I quote from the Hunsaker translation, page 240.

"These experiments (with the converging tandem) encourage us to believe that the problem of stability is not without solution, and that the safety of aeroplane flight is at last to be increased. *Such safety is the sole assurance for the future of aviation.*"

The italics are mine. This statement of Eiffel supports me in a position which I have held for some years, namely, that no great commercial future exists for the flying machine until it is so designed that any change in the pressure angle will introduce a righting couple. At present the couple introduced is an upsetting couple which has to be offset by the horizontal rudder.

The system which uses a rear surface set at a smaller pressure angle than the front surface is called the longitudinal dihedral and it is very old, probably originating with Pénaud in 1871. (See "Progress in Flying Machines," by Octave Chanute, page 117). Langley used it on his models and on his large machine and credits the idea to Pénaud. But, so far as I know, its use was confined to a small stabilizing tail which carried little or no weight until Mr. R. D. Andrews conceived the idea of using it between two supporting surfaces of equal area. Mr. Chanute himself, upon seeing Mr. Andrews' models some years ago stated that the principle of the longitudinal dihedral angle as applied by Andrews to two supporting surfaces was new. Certainly Mr. Chanute knew more about the history of aviation than any other man.

Both Pénaud and Langley used the rear surface as a stabilizer,

not as a weight carrier, Langley's tandem being parallel surfaces, the dihedral being between the rear surface and the tail. In other models using the dihedral, the front surface is much the smaller and acts as a stabilizer, not as a weight carrier. Mr. Andrews was the first, so far as I know, and so far as Mr. Chanute knew, to show that the both surfaces could be made large carrying surfaces and still act as stabilizers. Eiffel's experiments confirm this. I state this simply in the interest of truth because it has been written in this magazine that Dunne developed the dihedral before Andrews. The dihedral which Dunne has developed is nothing but a valuable modification of the Pénaud tail. Dunne has two tips at a negative angle, while Pénaud had one tail at a negative angle. Dunne gets more stability than Pénaud did because of the difference in size and position of his tips and Pénaud's tail.

The flights of the Dunne machine prove to my mind the practical value of the longitudinal dihedral angle, my only criticism of it is that it must be less efficient than Andrews' system in terms of thrust horse power because a large part of Dunne's surface *must* fly at an inefficient angle. Under no circumstances can a negative angle be an efficient angle for a lifting surface. Until I have seen the records of laboratory tests on his model showing the values of Kx and Ky I must hold this opinion. It is probable, now that the Dunne machine is to be used in France, that Eiffel will make some tests of it, and such tests should be extremely valuable and interesting.

Eiffel has tested a surface designed by Robert Mallet which is similar to Dunne's in some respects. The pressure angle of this surface decreases from positive at the root to negative at the tip and it is very inefficient, the least value of $\frac{Kx}{Ky} = .21$, as against .10 for Eiffel's number three. Moreover measured on a basis of $\frac{Ky^2}{Kx}$ (the pound, mile hour rating) it is still less efficient because its actual lift is low even at high angles. This follows from the fact that some of its area has a negative angle and hence can not carry much weight. Like Dunne's surface, however, the Mallet surface has longitudinal stability.

The few experiments made with the converging tandem, i. e. those of the type called "Canard," have, in my opinion, been badly designed for two reasons. First, the forward surface has been used as an elevator and of course this has disturbed the stream lines. I am of the opinion that the converging tandem must be treated as a unit and the elevator must be placed at the rear, back of the rear surface. As the c. p. always moves so as to keep the pressure angle constant, the elevator will not be needed to maintain longitudinal stability (it is not used for this purpose in the Dunne machine) but only to control the value of the angle of incidence, that is for climbing or gliding. Its greatest use will be in landing at the end of a glide without power.

Second, instead of making the surfaces equal in area the forward surface has been the smaller and this has placed the c. p. and therefore the c. g. so far back of the forward surface that its moment arm about the c. g. is too large and gusts set up troublesome oscillations. If the surfaces are equal in area the c. p. and therefore the c. g. will be close to the rear of the front surface, because this surface has a larger pressure angle and hence supports more weight per sq. ft. than the rear surface, so that the moment arm of the front surface about the c. g. will not be large and hence there will be little to fear from oscillations. If the surfaces *are* unequal the larger should be in front. Such a design is the opposite to the "Canard" and would look like a monoplane with a large tail, in fact it would be like the first Pénaud model built in 1871. To change such a monoplane to a converging tandem all that is necessary is to increase the size of the tail until it equals the front surface, give it the proper camber and fly the whole machine at a larger pressure angle. Certainly the essential thing for longitudinal stability is a difference of pressure angles, front and rear, but whereas in a monoplane the flat tail is not normally a lifting surface, by increasing the pressure angle of the whole system it becomes a lifting surface without losing any of its righting properties. This, practically, is what Andrews has done. To illustrate: Suppose the main surface of a monoplane has a pressure angle of 4° and the tail —2°, then the difference is 6°, and this difference alone is the cause of the righting action of the tail. This is the principle discovered by Pénaud years ago. But this tail does not lift, coming into play only with rotations about the lateral axis. Suppose now we change the thrust line and the c. g. so that the pressure angle of the front plane is +10°, then the tail will stand at +4° and it will be a lifting surface. It will still produce a righting couple because its pressure angle is less than that of the front surface, and if we want to increase the righting couple we must increase the camber and the area. This is just what Andrews has done and he was the first to do it.

In testing the tandem with a full-sized machine the tests should of course be made over water. I would choose a Breguet surface because its high actual lift at its most efficient angle reduces the necessary speed for any given loading and so cuts down the h. p. consumed by head resistance. I advise that two biplanes be used because of their high factor of safety and because, for the same span and aspect ratio, the area is greater. Of course there will be some loss of efficiency but in testing for stability I think it is wiser to lose some efficiency than strength.

The boat to support the surfaces should have a wide beam and a high freeboard forward and the step should be placed so that under power, and without surfaces, the thrust line will stand at +10°. Such a condition will insure rising from the water and the boat should be tested under power without surfaces to be sure this condition can be obtained. As the gap between the biplanes must be twice the chord this makes the distance fore and aft large and there is room for the screw between the surfaces. The biplanes should be attached to the boat so that their pressure angles can be changed (though not while flying) and also it should be possible to move either or both fore and aft or up and down. It would not be hard to design fittings for this purpose and such a mounting will allow flights to be made with the surfaces bearing different relations to each other. We know so little of the nature of the wake of a surface that no proper test of the tandem can be made unless some such mounting is used.

Two biplanes 36 ft. span, 3 ft. chord and 4 ft. gap will give 432 sq. ft. Using Breguet's wing at +7° and +3°, and driving at 50 m. p. h., we get the following data.

The front biplane at +7° consumes:

$$Kx = .0046 \times 1.1 \times 102 \times 216 \times \frac{50}{375} = 14.85 \text{ h. p.}$$

The rear biplane at +3° consumes:

$$Kx = .028 \times 1.1 \times 102 \times 216 \times \frac{50}{375} = 9.04 \text{ h. p.}$$

Assuming an equivalent area of 10 sq. ft. for head resistance, which is large, the head resistance consumes:

$$10 \times .0033 \times 50^2 \times \frac{50}{375} = 11 \text{ h. p.}$$

The total thrust h. p. is 35 and if the efficiency of the screw is 60% we require under 60 brake h. p.

The lift of the front biplane is:

$Ky = .0513 \times 1.1 \times 0.76 \times 102 \times 216 = 946$ pounds.

The lift of the rear biplane is:

$Ky = .0348 \times 1.1 \times 0.84 \times 102 \times 216 = 710$ pounds.

Therefore the total lift is 1,656 pounds.

Assuming 400 pounds for the engine, 200 pounds for the pilot and fuel for the test, there remains 1,056 pounds as a limit for the weight of the boat and surfaces. There should be no trouble in designing within this weight. A tandem monoplane will give more lift per thrust h. p. but it is better to use the safer biplane construction for first tests.

(*Continued on page* 189.)

EDITORIAL

At a meeting of the Aeronautical Society held on Thursday evening, September 11, 1913, Mr. Alfred W. Lawson, among other things, said:

DURING the past it will be found that Nature has invariably picked its strongest men to do its hardest work, and so we find in the aeronautical movement, just as in every other scientific and industrial movement which preceded it, that the strongest men are picked for the work and that the survival of the fittest prevails.

We find that those who are strong enough to carry the great burden of advancement upon their shoulders are still in service and doing good work, whereas the weaklings, who expected everything to come easy and rewards to be received without giving adequate efforts therefor, have been and are still falling by the wayside.

Those who have already quit the aeronautical movement because they lacked sufficient strength to stand the strain are of the same calibre of those men who also fell by the wayside for lack of sufficient strength to keep them in the railroad, steamboat, automobile, and other industries during their infant periods and who became quitters just as soon as they discovered that those industries were not get-rich-quick schemes, but a part of Nature's intricate workings for the lasting and substantial development of human affairs.

Permanent success along any lines cannot be acquired in a day nor in a year. If a man is successful before he dies at the end of a long life of hard work he should be satisfied and he will be then, and then only entitled to the applause of his fellow men, for it is the end of any race which counts and not merely the beginning, and no man can accomplish a really great work who does not have to overcome obstacles as he goes forward, and you men who have stuck to the aeronautical movement and given your best efforts toward its advancement during the past five years will no doubt continue to stick to it as long as you live and, finally reap the reward, either in the shape of financial remuneration or just pure satisfaction, that you are entitled to by observing its steady and natural growth to greater proportions than any other industry this world has ever known. But it will grow up gradually like the oak whose growth is slow but whose strength and solidity is acquired only through long patient effort.

Nature has not given mankind aircraft as a plaything; she has given it to him as a utility and therefore its development does not depend upon the exhibition end of it. Man's great desire and actual necessity of transporting himself from place to place in the shortest possible time makes it obligatory for him to secure speedier means of transportation, and as the aeroplane has developed from 35 miles an hour to 120 miles an hour within five years, and as I believe it is capable of advancing to two or three hundred miles an hour within the next 10 to 50 years, and as I also believe that no such tremendous speeds can be acquired by land or water vehicles, air transportation must eventually come into general use.

In a few years from now it will be about as ridiculous to expect a crowd of people to pay to see a man fly as it would be to expect a crowd to pay to see a man run an automobile at the present time, so that those who lament over the retrogression of the exhibition business are incapable of properly grasping the significance of the aeronautical movement.

The success of this movement depends upon the construction of capable aircraft that can be made serviceable. Personally, I think they are being made serviceable to-day and for that reason I have ordered a flying boat for my own use and which I intend to utilize as a vehicle to convey me from my place of business each evening after my work is done to my residence in the country about 40 miles away and return each morning and do it in less time and with more comfort than it can be done by either railroad train, automobile, steamboat or motor boat.

This is what I call utility and it will not be long before there will be thousands upon thousands of other business men in this country and other countries who will do the same thing. That means that a market will be opened up for the sale of great numbers of flying boats and these will have to be supplied by concerns capable of turning them out in large quantities. It is not unreasonable to suppose that within the next ten years there will be at least 50 large manufacturing plants established in this country for that purpose and these will necessarily have to purchase accessories and supplies from other manufacturers and in this way the industry will be put upon a substantial basis. So that those who have the courage and strength to stick to the movement will be the successful ones, while those who have not the strength and tenacity to make a good fight will fall back into the quicksands of obscurity and common-place.

Every able-bodied man between the ages of 20 and 50 should learn to fly, and those who are not able-bodied should give their efforts to the advancement of the movement in one way or another, either as capitalists, promoters, designers, builders or purchasers of aeroplanes. There are many skillful aviators who may be secured to pilot an owner's aeroplane in case he did not feel equal to the emergency himself. There is no good reason why every intelligent man should not aid in some manner in the development of air transportation.

PEGOUD FLIES UPSIDE DOWN AND CUTS A VERTICAL FIGURE S

One of the most remarkable feats ever accomplished in an aeroplane was performed by M. Pegoud on September 1 at Juvisy, France, on a Blériot monoplane when the daring pilot completed a large vertical figure S in the air during which he was flying upside down for a distance of about a quarter of a mile. This feat, which was successfully repeated on the following day at Buc is described by an eye-witness as follows:

"Mr. Pegoud's exploit, although nearly equivalent to looping the loop, was no mere acrobatic exhibition. It was practical proof of M. Blériot's theory that a properly constructed aeroplane, blown by the wind into any position, can always be righted by the pilot; also that it never loses its flying capacity, even if it is completely overturned.

"It was soon after six o'clock in the morning that M. Pegoud's Blériot monoplane, an ordinary one fitted with a 50-horse power Anzani motor, was brought out of its shed at Juvisy.

STAYS STRENGTHENED AS PRECAUTION.

"No essential feature of the machine had been modified. Certain parts, however, notably the stays on the wings, had been strengthened as a matter of precaution.

"The monoplane in a few minutes was soaring upward. The machine rose to a height of 1,000 metres. Then the suspense began, agonizing undoubtedly to the friends of the aviator.

"Suddenly the monoplane dipped slightly earthward, the propeller turning more slowly. M. Pegoud evidently shut off a portion of the engine's power. Gradually the machine dipped more acutely, until finally it was pointing straight downward and dropping at a terrific speed.

"Already some were covering their eyes to shut out the spectacle.

"At a height of 200 metres the tail of the monoplane was seen to incline again. In a few minutes the aeroplane turned a somersault. M. Pegoud, head downward, continued to pilot the machine in this reversed position on a straight line for four or five hundred metres.

COMPLETES A LETTER S.

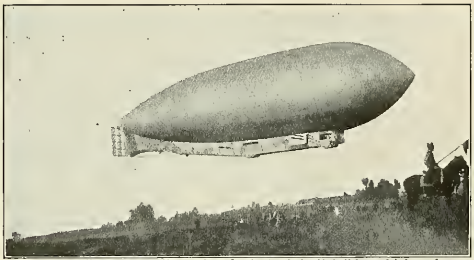
"Then the tail began to rise, and M. Pegoud, completing gracefully the final curve of the letter S, was now skimming over the fields with the aeroplane in a normal position.

"M. Pegoud, when interviewed, made light of the astounding exploit.

"'I felt quite at ease the whole time, even when flying with my head downward,' he said. 'I was comfortable enough. I had one full moment when I laughed because I pictured myself in a barber's chair being sprayed after a shave. This was when I had my back to the earth and gasoline began to spill over my face.

"'I noticed the unusual visibility of things on the earth while I was in my head down position.'

"M. Pegoud announced that, with M. Blériot's approval, he would continue his experiments to prove that a skillful pilot can right his machine from almost any position."



The new Italian totally-enclosed Forlanini dirigible which, after successful trials, was taken over by the Italian military authorities.

Foreign News

BY

Arthur V. Prescott

Algeria

It is reported that on August 24th Servies on a Deperdussin with a passenger flew a distance of 125 kilometers at Oran, thus establishing a distance record for Algeria.

Belgium

On August 7th, starting from Ghent in the afternoon, Crombez, on his Deperdussin, flew over to Ostend, landing on the sands where his father and mother were awaiting him. After an hour's stop he flew over to Blankenberghe, circling above the royal palace on the way.

Cuba

On August 28th Augustin Parla, in the Curtiss hydro-aeroplane which he flew from Key West to Havana, established a Cuban duration record by flying for one hour and three minutes.

It is announced that a group of wealthy Cubans are to purchase a hydro-aeroplane for Parla's private use so that he can continue to give demonstrations and carry them on passenger trips.

England

SOPWITH HYDRO-AERO MAKES REMARKABLE SHOWING IN ROUND BRITAIN WATER PLANE FLIGHT.

On August 25, Hawker, on his 100 h. p. Green motored Sopwith tractor hydro-biplane, accompanied by Kauper as passenger, set out in a second attempt to win the $25,000 prize put up by the London Daily Mail for an over-water flight around Great Britain. The start was made from Southampton at 5.30 a. m. in a thick mist which partly hid the machine as it sped out of the harbor on what was to be one of the most remarkable over-water flights accomplished to date.

Once outside of Southampton harbor, the weather cleared up a bit and Hawker steered a straight course down the Solent and out to the English Channel. Round the coast line a good deal of mist was encountered and Hawker had to rely on his compass at several points. However, Ramsgate was reached at 8.08, the 144 miles from Southampton having taken 159 minutes. At 9.08 o'clock Hawker left Ramsgate and headed for Yarmouth, a distance of 96 miles, which was covered in 88 minutes. Hawker, who, benefiting from his first experience when he suffered from an attack of sunstroke, had taken care to protect himself, was feeling quite fit on reaching Yarmouth, but his mechanic, Kauper, was suffering slightly from the strain.

After resting awhile the machine was again off at 11.44 and headed for Scarborough, a distance of 150 miles, which was reached at 2.42 p.m. Throughout this stage the pilot was bothered by side winds and gusts, which taxed his skill and proved the airworthiness and the staunch construction of the Sopwith craft as well as the reliability of the 100 h. p. British Green motor. After resting on a yacht the two waterplane voyagers again mounted their machine and at 4.22 skimmed out of Scarborough harbor headed on the next stage to Aberdeen, Scotland, a distance of 218 miles. In view of the length of this stage, they determined to make an intermediate stop at Berwick to pick up gasoline. On the way, however, a leak developed in one of the water pipes and a stop of one hour and five minutes had to be made at Seaham harbor in order to effect a repair. At 6.40 the journey was resumed, but luck was against Hawker and another descent had to be made, this time at Beadnell, about 20 miles south of Berwick. This occurred at 7.40 p. m., and owing to the darkness and an adjustment which had to be made, further flying for the day was given up and the pilot contented himself with having covered the remarkable over-water distance of 495 miles, which constitutes a world's record for over-water flying in a single day.

They decided to start early the next morning, but owing to unforeseen conditions, were unable to get away until 8.05. In 20 minutes they had passed Berwick and at 9.55 a stop was made at Montrose for water, where adjustments took up half an hour. They, however, proceeded on to the control at Aberdeen, which was reached at 10.58, the machine coming down from a height of about 1,500 feet in a fine spiral glide. The weather had now become very favorable and both pilot and passenger were in fine form. At Aberdeen just under an hour was spent in attention to the machine and at 11.52 they left, headed for the next control at Cromarty, 134 miles away, which was reached in 2 hours and 13 minutes. The next stage from Cromarty to Oban, a distance of 94 miles, was the most trying and dangerous of the whole route, for it necessitated flying over the Caledonian Canal and in a mountainous region which made flying extremely difficult, and that this was the case can be seen from the time it took to accomplish this stage, for although Cromarty was left at 3.05, it was six o'clock before the control at Oban was reached. It was then too late to think of starting on the long stage to Dublin, so the pilot and mechanic decided to take advantage of a good long rest and get an early start the next morning.

Accordingly, at 5.42 the following morning, they started for Dublin, although, in view of the length of the stage, they had decided to make a stop at Larne for gasoline. The machine, however, did not rise with its accustomed ease and Hawker took her to the beach about a mile out of Oban. It was there found that there was water in the float and an hour was spent in getting rid of it, after which they got away in good style and steered down the Firth for the Irish coast. They had, however, to make a half hour's stop at Kiells, Argyllshire, to make some slight adjustments on the motor. They got away again at 8.25 and at 9.30 made a splendid descent in Larne harbor. At eleven o'clock they left Larne and proceeded towards Dublin, and only a few short miles from the latter place Hawker thought the engine was not working quite right and that the valve springs had weakened, so, rather than risk failure, he decided to land and make an inspection.

This was an unfortunate decision, for, while making the spiral descent, his foot slipped from the rudder bar, apparently through his boot being greasy, and he lost control of the machine, whereas if he had kept on his course to Dublin, where Mr. Green awaited him with new springs, he would probably have made it without accident. However, Hawker escaped uninjured, but his mechanic suffered a broken arm and cuts about the head, and the machine was badly smashed.

So ended this great over-water flight of 1,043 miles, just 497 miles short of completing the circuit of Great Britain, a distance of about 1,540 miles.

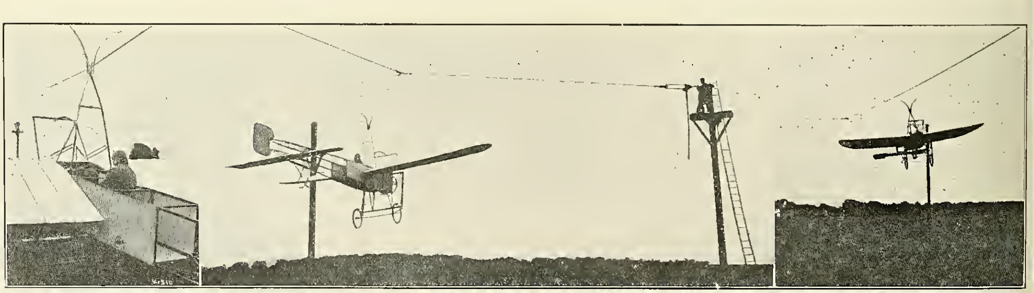
In recognition of the skill and courage displayed in accomplishing this trip, the Daily Mail announced that a personal gift of $5,000 would be made to Mr. H. G. Hawker.

BEATTY, IN HIS WRIGHT BIPLANE, A FEATURE AT HENDON

The popularity of the week-end flying exhibitions and aerial races at the Grahame-White aerodrome at Hendon is evidenced by the great crowds which flock to the grounds every Saturday and Sunday and the average attendance is about 15,000, while even on week days great numbers of people show up to see the exhibition and practice work going on.

What probably accounts for the success of the Hendon aerodrome is that one can reach the field from any direction for a few pence on the always available 'bus or twopenny tube or by automobile.

STARTING AND LANDING AN AEROPLANE ON A CABLE



The above picture shows Pegoud testing Blériot's latest device for start ing and landing on a cable. The picture on the left shows the tong-like arrangement for grabbing the cable. The centre picture shows the aerop lane leaving the cable, while the one on the right shows the aeroplane about to alight on the cable.

Then, again, there is always a staff of experienced aviators on hand, some of whom can fly in almost any winds, thus the visitor can almost invariably depend upon seeing some good flying, even if conditions are too bad to permit of the usual programme, which generally consists of races, passenger carrying, fancy flying and other feats. Sometimes there are as many as twenty or more pilots on the ground, while in addition the field is used for the landing and starting place of aviators making big cross-country trips, most of the aviators flying from or to France, using the aerodrome as their alighting place.

Amongst the celebrated French aviators who have recently been flying at Hendon are Brindejonc des Moulinais, Gilbert, Perreyon, Gougenheim, Chevillard, and others, several of whom flew their machines over from the Continent. On the staff of the Grahame-White Company and those who can be seen at the aerodrome any day are George W. Beatty, the well-known American Wright pilot, with a Wright machine; Pierre Verrier, the celebrated French pilot, with Maurice Farman machines; Marcus D. Manton, an English pilot, these three all being able to fly in extremely high winds. In addition there are many other excellent pilots on the staff, while such excellent flyers as Gustave Hamel, R. Slack, B. C. Hucks, Raynham, Bauman, Pickles, Lieut. Grey and others have been appearing quite often.

Following the spectacular flights of Chevillard, Hendon thought it had seen pretty nearly everything in the way of trick flying, but with the arrival of George W. Beatty the aero fans were given some new thrills for his steep banks and up-spirals are every bit as wonderful as Chevillard's steep spirals, and the way in which his Wright machine, which used to fly in great shape with the 35 h. p. Wright motor, now leaps and bounds through the air with a 60 h. p. rotary motor, is the marvel of all. As evidence of the carrying capacity of his Wright machine, which, by the way, is several years old, but has just been recovered by an English firm, Beatty recently took up three passengers in it to a good height and made several trips around the aerodrome, which is a record for England.

France

DEAUVILLE HYDRO-AERO MEET

The Paris-Deauville race, organized as a prelude to the competition for naval waterplanes, organized by the French Aero Club, created a tremendous amount of interest, as was shown by the large crowds which lined the banks of the Seine on the day of the race, August 24th.

The starting place was at Le Pecq, just outside Paris, and Weymann, on a Nieuport, was the first to get away at 8.30. Within two minutes Levasseur, on a second Nieuport, left, and then at intervals of a few minutes, Prevost on a Deperdussin, Janoir (Deperdussin), Molla (Leveque), Chemet (Borel), Rougiere (Bathiat), DeMontalant (Breguet) and Divetain (Borel-Denhaut). Prevost, Molla and Rougiere made false starts, but finally managed to get away. The course following the Seine was 330 kilometers, or a little over 200 miles, and at each bend in the river an official was stationed to see that the route was followed. The first to complete the journey was George Chemet, who covered the distance in 3 hours 47 minutes 50 seconds. Levasseur did not arrive until four hours later, owing to motor troubles, while Molla, who had been in trouble with his gasoline tank leaking, had to make several stops and did not arrive until a little over an hour after Levasseur. The maximum time for the course was ten hours and eleven minutes; after this had elapsed Janoir crossed the finishing line.

As DeMontalant in the Breguet approached Rouen and while at a good height the machine was observed to be rolling badly, and all at once it was seen to pitch forward, flinging the unfortunate pilot and mechanic out of the machine.

The times of those who completed the course were: 1. Chemet (Borel, 80 h. p. Gnôme motor, Chauvière propeller), 3 h. 47 m. 50 s.; 2. Levasseur (Nieuport, 160 h. p. Gnôme motor, Chauvière propeller), 7 h. 38 m. 15 s.; 3. Molla (Leveque, 100 h. p. Gnôme), 8 h. 46 m. 11 s.; 4. Janoir (Deperdussin, 100 h. p. Gnôme), 10 h. 11 m. 4 s.

On the following day, August 25th, the naval competition commenced in the inspection of the machines present, which included two Maurice Farman, two Caudron, two Deperdussin, the Borel, the Dussot and the Leveque. During the morning Moneau and Bregi arrived on their Breguets from Havre, while Weymann on his repaired Nieuport came from Rouen, and Divetain arrived on the Borel-Denhaut, which had had its float damaged. In landing the temporary repairs to the hull gave way and the machine began to sink, but fortunately the pilot and his machine were rescued.

In the afternoon a start was made for the preliminary trials. Bregi, Moneau and Caudron each did the figure eights around the two buoys placed 400 metres apart, the machines being operated on the water. Moneau and Bregi carried out the rising tests, which had to be done at a maximum distance of 400 metres, and also anchoring trials, in which the machines had to remain held by their anchors for an hour, during which the floats were inspected for leakages, etc., the conditions stating that any machine with leaky floats would be disqualified. Moneau also carried out the altitude test, while Caudron did the fourth test, consisting of a flight around a course with the wind blowing ten metres a second.

On August 26th the figure "8" test was carried out by Renaux (M. Farman), Levasseur (Nieuport), R. Caudron (Caudron), Prevost (Deperdussin), the get-off test by Levasseur, R. Caudron, Prevost, Molla (Leveque), the mooring test by Levasseur, Chemet (Borel), and Molla, the altitude test by Bregi (Breguet) and Molla, Bregi climbing the 500 metres in 8 m. 10 s., speed and duration tests by Bregi, Chemet and Molla.

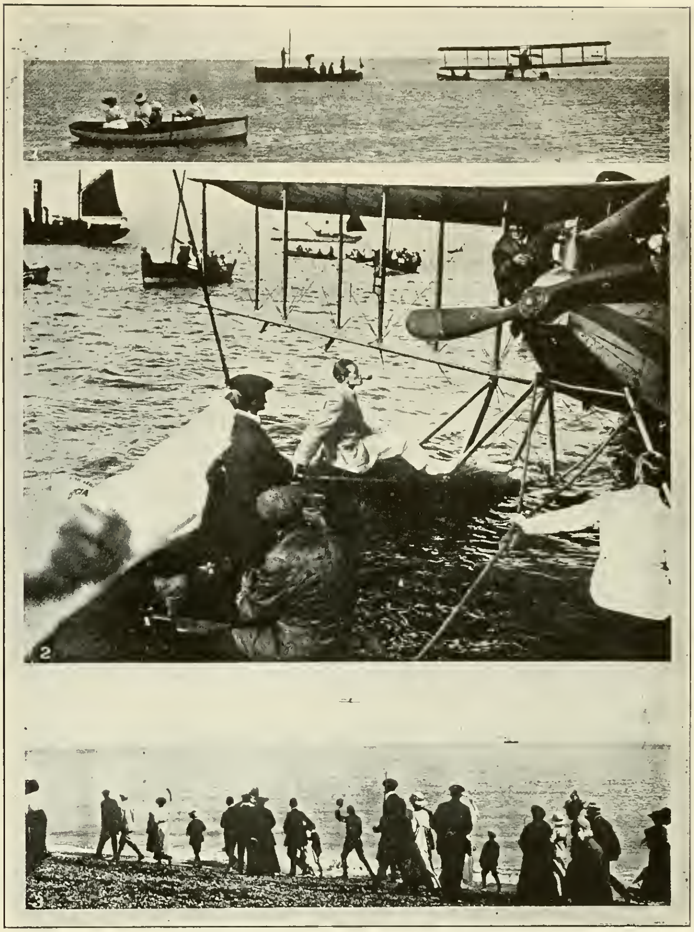
In these last tests, which were run in conjunction, the machine first flew for half an hour over a course of at least a nautical mile, with and against the wind, when the mean speed had to be not less than 45 knots. Then the machine continued without stopping for another half hour, and eventually landed in full view of the officials. During this flight the petrol consumption was measured. Bregi also did the equilibrium test, in which the machine had to turn itself head to wind. To test this, the machine was first moored with the wind behind, and then cut loose. During the morning Bertin, one of Nieuport chief pilots, arrived with a passenger from Villacoublay, and in the afternoon Audemars was doing some fantastic flying.

THE INTERNATIONAL GORDON BENNETT MEET

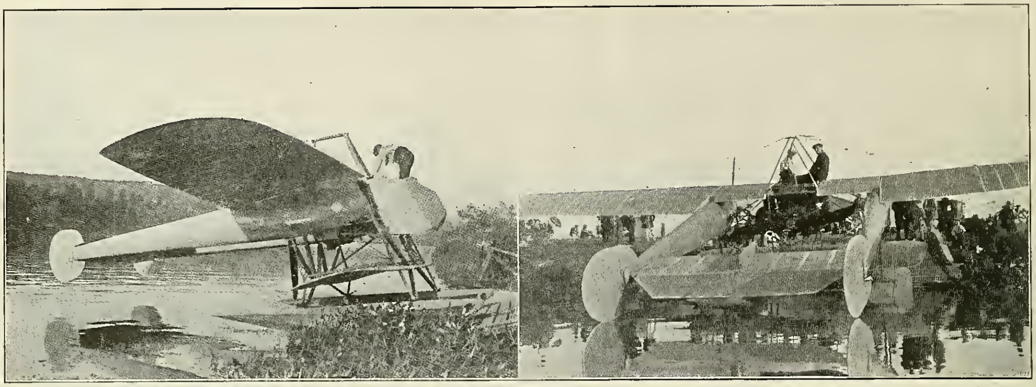
The programme, as announced by the Aero Club of France, concerning the three days' Gordon Bennett meet, to be held on September 27, 28 and 29, is as follows:

The first day will be given up to the French eliminating trials for the Gordon Bennett race, the course for which will be 100 kiloms., half the distance of the race itself; the programme for the second day will be made up of speed, speed-range, altitude, and cross-country competitions, while the Gordon Bennett race will take up the last day. For the race six countries have entered, but only France and Great Britain have entered full teams of three each. The United States will send two, and Belgium, Germany and Italy one each. On the second day, for the speed contest, which will be over 3 laps of the 10 kilom. course, competitors will be required to qualify by flying over an out and home course of four kiloms. at a speed of at least 65 kiloms. an hour. In the speed-range contest the competitors will qualify by going one round of the 10-kilom. course at a speed of at least 90 k.p.h., while the award will be based upon the slowest speed made on the out and home course of four kiloms. marked out by two pylons placed two kiloms. apart. In the altitude competition, there will be three sections: pilot alone, pilot and one passenger, and pilot and two passengers. The cross-country event will be of 150 kiloms., five times round a 30 kilom. circuit, and there will be two classes: 1. Monoplanes; 2. Multiplanes. The Gordon-Bennett race will be of 200 kiloms. over a circuit of at least 5 kiloms. round, and it will start at 9 A. M.

A REMARKABLE WATER-PLANE FLIGHT



The above picture shows some of the scenes of Hawker's attempt to win the *Daily Mail* prize of $25,000 for a 1,600 mile flight around England in 72 hours. After a plucky attempt in which 1,045 miles were covered, the flight was ended owing to the pilot's foot slipping off his rudder bar when descending in a spiral.



The new Nieuport Scouting Water-plane. The machine is constructed to carry the pilot and two passengers, and the engine is placed behind its occupants, thus giving them a clear view—a very important matter when the air-craft is engaged on scouting work for an army or navy.

THE FRENCH AERO CLUB TROUBLE.

It will be remembered that soon after the winning of the Gordon-Bennett Aviation Trophy in America last year by Vedrines, M. Deperdussin offered the use of his aerodrome at Betheny, near Rheims, for this year's race, and also offered to provide prizes, etc. These arrangements were accepted by the Aero Club of France, but following on the financial difficulties in which M. Deperdussin has become involved, a strong agitation, in which certain constructors have taken a leading part, has been at work to have these plans cancelled. It seemed that this was the general feeling of the Club, and M. Deutsche suggested that the War Office should be asked for permission to hold the contest on Chalons Camp, and he also offered 100,000 francs to replace the cash gift of M. Deperdussin. At a meeting of the Club on Tuesday, however, there was a large majority in favor of holding to the original arrangements, and as a protest Comte de la Vaulx, M. Louis Blériot and M. Alfred Leblanc have resigned as officers of the Club.

DUNNE BIPLANE FLIES OVER PARIS.

On August 20th, Parisiens were treated to the sight of the Dunne biplane piloted by Commandant Felix in flight over their city. Especial interest was lent to the performance, for at the same time Bosano on a Deperdussin was also flying over the city so that the marked contrast in the design of the two machines could be noticed.

GERMAN AVIATOR FLIES FROM BERLIN TO PARIS.

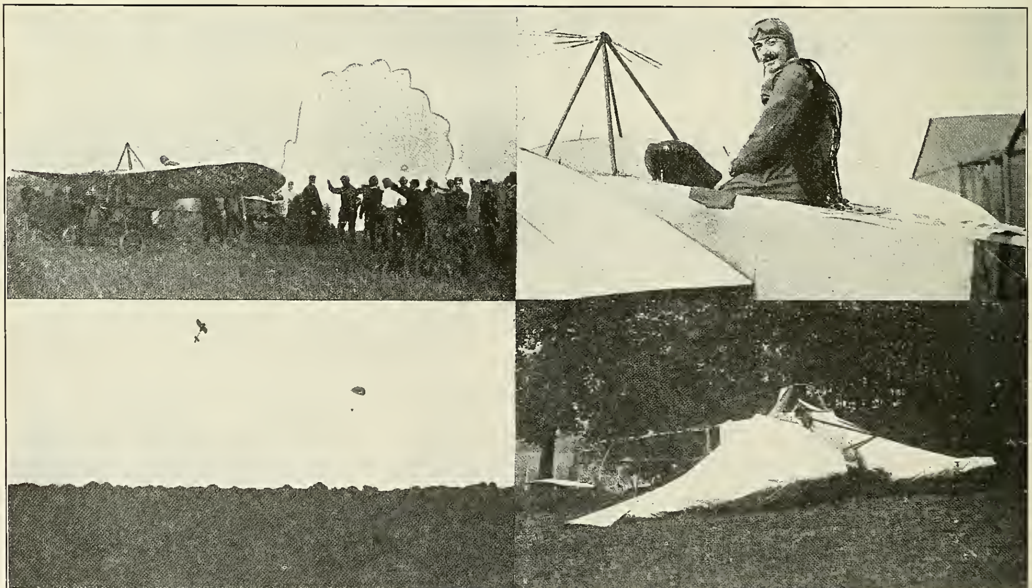
The first German aviator to return the numerous calls of French pilots to their capital is Herr Alfred Friedrich, the noted Etrich pilot, who, accompanied by Dr. Elias as passenger, arrived at the French capital on September 7. They left the Johannisthal aerodrome, near Berlin, on September 5, but were delayed en route owing to rain and fog.

FOURNY FLIES 10,000 MILES IN COMPETITION FOR MICHELIN CUP.

In twenty-two days' flying in the competition for the Michelin Cup, Fourny surpassed all records for this event by flying approximately 10,000 miles, or an average of the remarkable distance of 455 miles a day.

Cavelier, another competitor for the same event, covered 7,096 kiloms. or 4,409 miles in nine days' flying and they both flew round a course of approximately 112 kiloms.

PARACHUTING FROM A MONOPLANE



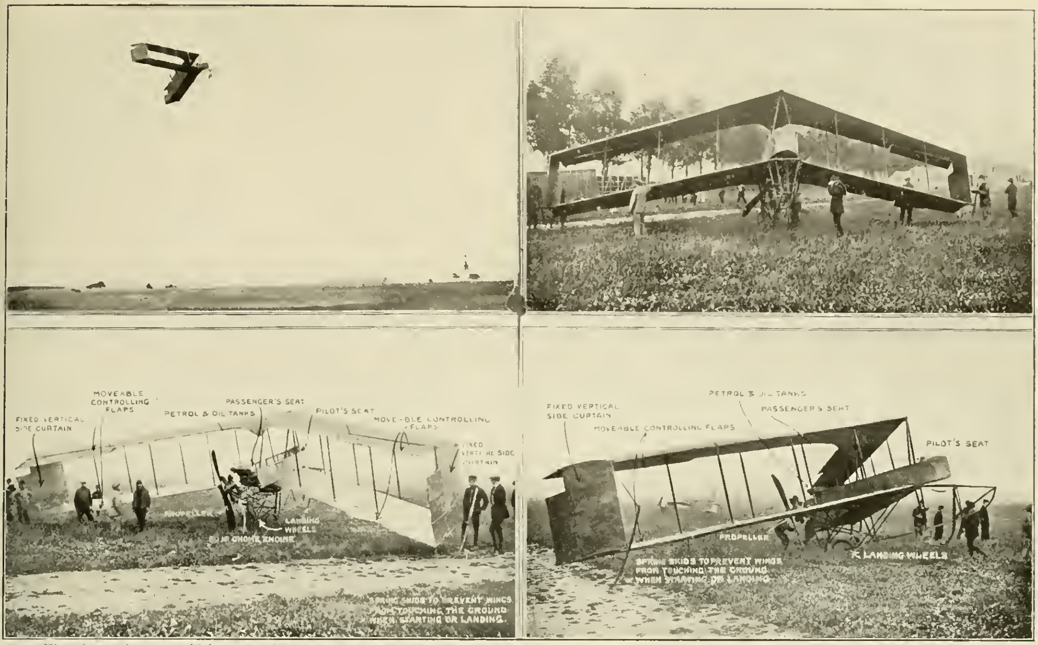
The top left-hand picture shows M. Pegoud testing the spreading of the parachute with which the French aviator recently made a daring experiment at the Chateau Fort aerodrome, near Paris.

In the top right-hand picture M. Pegoud is seen with the parachute ropes attached to his back. The parachute, which is contained in a folding sheath attached to the framework of the monoplane, is released by means of a lever. The parachute then expands and allows the aviator to drop gently to earth.

The lower left-hand view shows the parachute and monoplane falling to the earth. When at a height of about 700 feet M. Pegoud detached the parachute and floated on to a cluster of trees, from which he was released.

Lower right-hand picture shows monoplane after the fall. On reaching the ground the aviator was carried in triumph to the aerodrome. The monoplane was mostly damaged by hitting the trees.

THE DUNNE BIPLANE IN FRANCE



The above pictures, which were taken at the recent demonstration of the Dunne machine's wonderful stability before a commission of French army experts, show the biplane in several aspects and illustrate clearly the general form and shape of this remarkable aeroplane, which is continuing to give successful demonstrations. It was recently flown over Paris ana on to the Deauville meeting where the machine astonished the spectators and aviators present by flying steadily with the pilot standing on his seat and waving his hands and then climbing out along the planes to the first strut. On another occasion, when the motor stopped, the pilot climbed out of his seat and walked back along the cabin, a distance of eight feet to try and fix it, but being unable to do so returned to his seat, the machine all the time having kept up a steady, even glide. For explanation and description of the Dunne machine see September, 1913, issue of AIRCRAFT, pages 156-157.

FLYING ON FARMAN'S.

On one of his machines Maurice Farman, accompanied by his brother, Dick, recently flew from Buc by way of Rambouillet and Chartres to Chambourd. On the return trip Dick Farman acted as pilot and Maurice Farman enjoyed the somewhat unusual experience of a joy ride in one of his own machines.

MADAME DE LAROCHE FLYING SEAPLANE.

Madame de Laroche and Vial recently gave a series of exhibition flights at Granville, using Henry Farman water planes. Madame de Laroche handled her machine with splendid style.

Germany

LONG CROSS COUNTRY FLIGHTS IN GERMANY.

On August 7, Lieut. Ludwig, accompanied by Lieut. Von Valkenbein, a son of the Minister of War, started from Johannistbal at 4:20 A. M., and after flying in the direction of Thorn for 3 hours, they made a landing, having covered 320 kilometres.

On August 8, Friedrich, the well known German Etrich pilot, started from Johannistbal at 4:30 A. M., and landed at Koenigsberg at 10:57 A. M., after having made one stop on the way.

NEW GERMAN PRIZES.

A sum of $75,000 has been set aside from the National Fund to provide half a dozen prizes to be awarded for aerial journeys of at least one thousand kilometres which must be made between midnight and midnight in one day.

NAVAL ZEPPELIN "L-1" WRECKED AT SEA IN GALE.

While the Zeppelin Naval airship "L-1," engaged in naval manoeuvres, was flying from the German coast to the island of Heligoland, she was caught in a sudden hurricane and beaten down to the waves and wrecked in the North Sea. There was a crew of 21 officers and men on board out of which only seven were saved. Among those who lost their lives were Capt. Metzing, commander of the marine airship division; Capt. Hanne, commander of the wrecked airship and Baron von Maltzahn.

The "L-1" was engaged in reconnaissance work in connection with the torpedo boat manoeuvres. She was equipped for a thirty hours' cruise, was on a full war footing and observing the conditions of actual warfare.

The airship kept at a height of between 4,200 and 5,000 feet. The cold atmosphere caused a heavy loss of gas and, as she was overloaded, the airship had already become unmanageable when the storm struck in suddenly from the north. When the crew saw danger approaching a wireless message was sent asking for help and indicating the intention of landing on the water behind Heligoland.

The torpedo boats rushed to the assistance of the airship, but observed the signal "Cast out entire water ballast." The airship, however, failed to respond, and fell swiftly to the sea.

Most of the officers remained in the cabins, not expecting a catastrophe, and they were crushed under the weight of the craft and were drowned. Others in the gondolas jumped into the water and some of them were rescued.

AIRSHIPS WIN OVER AEROPLANES IN GERMAN MANOEUVRES.

On September 9 a theoretical battle in the air between Zeppelin airships and many aeroplanes was the feature of the grand manoeuvres of the German army at Breslau. Theoretically the Zeppelin with Count Zeppelin commanding, destroyed a hostile aeroplane on the opposing side. It eluded the pursuit by other aeroplanes and returned unscatbed to announce the result to Emperor William who was the umpire.

FIFTY WATERPLANES ORDERED FOR GERMAN NAVY.

It is announced that the German naval authorities have placed orders for fifty waterplanes to be distributed between Wilhelmshaven and Heligoland in the North Sea and Warnemunde, Kiel and Putzig in the Baltic. They are to be delivered by January next.

TRIPLANE ACCOMPLISHES LONG FLIGHT.

On August 22 at the conclusion of the Gotha meeting, Stoeffler, accompanied by Capt. Berchtold, flew on his Albatross triplane to Strassburg, making a non-stop flight of 350 kiloms.

Holland

CHEVILLARD HAS ROYAL PASSENGERS.

Chevillard's recent exhibition flights on his H. Farman biplane in Denmark proved very popular and the pilot had no lack of passengers. They included a great many distinguished personages, one of them being Prince Axel, cousin of the Danish King. On August 9th Chevillard flew across the sound from Copenhagen to Malmao in 30 minutes. The return trip was made on the following day with Prince Axel as passenger.

Italy

Lieut. Cattaneo on his Blériot on August 5 flew from Milan to Turin in 1 hr. 10 mins.

MILITARY AVIATOR MAKES 1,300 KILOMETRES CROSS COUNTRY TRIP.

Lieut. Suglia on a Blériot monoplane accomplished a cross country trip of 1,300 kiloms. from Turin to Bari taking three days for the journey. The stopping-places were Rome and Naples. This is the longest flight made by an Italian military pilot.

New Zealand

A Blériot monoplane has been presented by the Imperial Air Fleet Committee to the New Zealand Government. It was recently christened "Britania," and given its trial flights in England by Gustav Hamel before shipping to New Zealand.

South Africa

FIRST AVIATION SCHOOL IN AFRICA.

The first aviation school in South Africa was recently established at Kimberley by Mr. Compton Paterson, the English pilot of a Curtiss type Gnôme driven biplane of his own construction. The pupils are mostly officers of the first class of the Defense Force.

An aviation corps has also been formed with headquarters at Pretoria.

Russia

At the Review held at Krasnoie Selo on August 10, fifteen aeroplanes took part. While the troops were manoeuvreing the machines, which included 11 Nieuports, 3 Farmans and a Wright, carried out a series of flights. Sikorsky's giant biplane, which we illustrate on the contents page of this issue, was on the ground, and after the review was closely inspected by the Czar, and afterwards, with a number of passengers aboard, was flown in his presence.

AN EXPLANATION OF PEGOUD'S FEAT OF FLYING UPSIDE DOWN AND WHAT IT REALLY DEMONSTRATES

By WALTER H. PHIPPS

On September 1, the French aviator Pegoud amazed the world by making a sort of loop in the air during which he flew his Blériot machine completely upside down for a distance of about a quarter of a mile. This feat was again repeated by Pegoud on the following day in order to demonstrate to the skeptics that it was a perfectly feasible accomplishment and not a mere matter of luck as so many would suppose.

These two flights were made to demonstrate M. Blériot's theory that a properly constructed aeroplane could be tipped over in almost any direction in the air and that if the pilot was skillful and clear headed he could right the machine even in the case of complete capsizals.

Pegoud's feats prove that in a way M. Blériot was right, but that they have the value and significance that Blériot attaches to them is another question, for how many aviators are there to-day who are skillful enough to right their machines in the manner that Pegoud did and even granting that they could do so what consolation is this to an aviator if his machine is capsized two or three hundred feet from the ground, for then even greater skill than Pegoud's could not save him from disaster, for it must be remembered that it takes a drop of considerable distance in order to right a machine under such circumstances.

As the writer looks on this feat it is absolutely and positively not a demonstration of stability but rather a demonstration of the wonderful skill and clear-headedness of the pilot, and in the following explanation the writer will attempt to show that this is the case.

In order to make this explanation more clear and to allow every reader to test and prove to himself the correctness of the theories advanced herein, it is only necessary to construct a paper model of a Blériot monoplane similar to the one shown in figure 1 or to take any light weight scale model Blériot, and make the following tests.

If the paper model is weighted at the nose with a couple of paper clips and the model is then glided, one of several things will be observed to take place. In the first place, if the clips are too far forward the model after leaving the hand will glide downwards and then all at once reverse itself, turning inwards and onto its back, thus completing the first part of Pegoud's vertical figure S. In order to make the model right itself from its inverted position it is only necessary to bend the tail in the reverse direction (downward when the model is held upside down), shift the weight forward and launch it upside down from the hand. It will be found that the model will complete the lower part of the figure S, turning right side up again, exactly in the manner that Pegoud's machine did. These experiments prove that when a machine of this type starts to fall, that the faster its speed increases the faster it loses its stability, which is just the opposite of what should take place, for if there was the slightest degree of inherent stability in the craft this increased speed, due to falling, should increase the lift on the front of the machine and decrease it in the back. The reason for this is easily traceable to the lifting tail in the rear, as a few experiments will disclose, for it will be noticed that the least bending of the tail plane downwards will accentuate this diving while it takes quite a bit of bending the tail upward to prevent it.

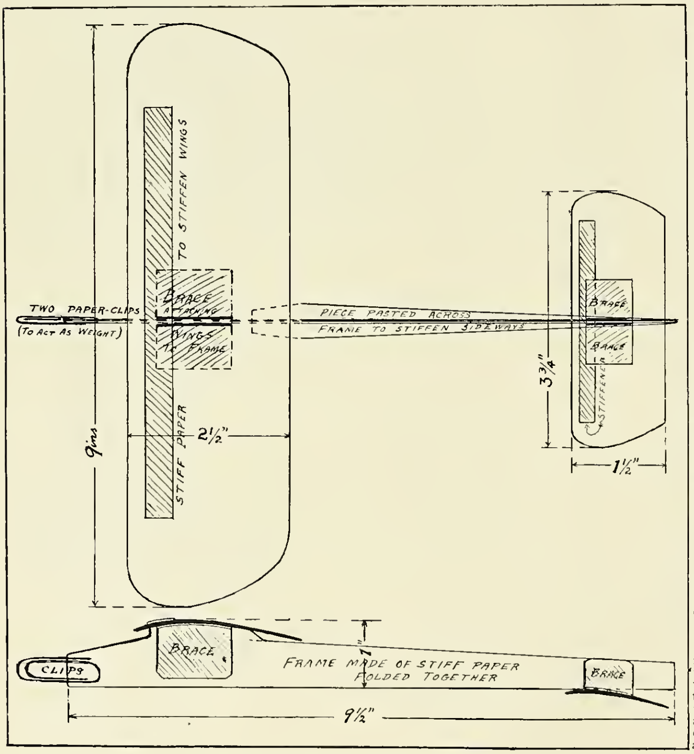
The lesson to be learned from this is that if a lifting tail surface is to be used it should never under any circumstances be set at a steep angle.

If in continuing experiments with the paper model the pins are pushed slightly back, or if experiments are conducted with a larger model, the weight is shifted slightly backwards and the experiment of launching the machine from the hand again tried, it will probably be noticed that the model will glide a little better, but it will be found with repeated trials that the models without disturbing their weights or adjustments in the least will quite likely act differently each time. They will sometimes glide for quite a little distance, apparently on an even keel, and then all at once, owing to their speed and attitude being slightly effected by little air currents, they will be noticed to either dive suddenly or again absolutely stall in the air, in most cases turning over onto their backs.

The actions of the model prove conclusively that from the stability standpoint the Blériot monoplane or any similar monoplane is most stable upside down although it has very little efficiency in this position. The reasons for this are as follows: As soon as a Blériot monoplane turns upside down its main wings and tail present a fore and aft upward dihedral to each other which, for the reasons pointed out in previous articles by the writer, immediately make a machine stable longitudinally, while just the reverse is the case when a Blériot or lifting tail machine is flying right side up.

In conducting experiments with large Blériot type models fitted with motive power it is practically impossible to make one of these machines fly for any but the shortest of distances before they either plunge head first or stall. This is owing to the fact that such a type machine has very little inherent stability and also that whenever it gets out of balance longitudinally the effect of its planes and tail is to exaggerate and aid the tendency to dive or stall instead of tending to correct the balance. This is due to the fact that when the machine is thrown slightly out of equilibrium by air currents, and is pointed upwards the lift on the main plane increases while the lift on the tail falls off, thus making the craft stall more and more. In the event of the machine pointing slightly downwards, the lift of the front decreases while the lift of the tail increases, thus forcing the machine to dive more and more until it completely turns over on its back.

On a large machine of the Blériot type the pilot's skill is continually called upon to conteract these diving and stalling tendencies, and owing to the fact that he can practically change more than half of this lifting surface into an elevator he is consequently enabled to counteract these changes in the balance of the craft. It is owing to this control that if the pilot is skillful enough he can let his machine turn over on its back, and fly along in this position and then by using his elevator force the machine back again to its normal position. It will therefore be seen that it is not the stability of the craft which accomplishes the righting effect but rather the skill of the pilot, and how many of our pilots are there who would care to duplicate this performance, especially at a low altitude.



CHRONOLOGY OF MODEL AVIATION

By NICHOLAS S. SCHLOEDER

The following tables contain the complete list of all official American records made since the beginning of the West Side Y. M. C. A. contests held in New York in the fall of 1909.

These contests marked the beginning of regular model events in this country. No record appears which, so far as is ascertainable, was not made in open competition, for a prize.

DISTANCE, RISING OFF GROUND (INDOORS).

Oct. 30, 1909, W. H. Aiken, 44 ft., West Side Y. M. C. A., N. Y.

Oct. 30, 1909, Wilson Marshall, 53 ft. 10½ in., West Side Y. M. C. A., N. Y.

Nov. 6, 1909, J. K. Dalkraman, 69 ft., West Side Y. M. C. A., N. Y.

Nov. 13, 1909, W. H. Phipps, 78 ft., Gould's Riding Academy, N. Y.

Nov. 20, 1909, J. K. Dalkraman, 92 ft., Gould's Riding Academy, N. Y.

Dec. 4, 1909, Dr. Carlton Dederer, 119 ft., Gould's Riding Academy, N. Y.

Dec. 18, 1909, Percy Pierce, 152 ft. 3 in., 22nd Regt. Armory, N. Y.

Jan. 16, 1910, Dr. Carlton Dederer, 189 ft., 22nd Regt. Armory, N. Y.

Feb. 4, 1910, F. M. Watkins (Boys' Class), 174 ft., 22nd Regt. Armory, N. Y.

May 7, 1910, F. M. Watkins (Boys' Class), 175 ft., 22nd Regt. Armory, N. Y.

May 19. 1910, Dr. Carlton Dederer, 204 ft., 69th Regt. Armory, N. Y.

June 4, 1910, Frank Schober, 215 ft., 22nd Regt. Armory, N. Y.

Dec. 3, 1910, Percy Pierce, 222 ft. 6 in., 22nd Regt. Armory, N. Y.

Feb. 21, 1911, F. M. Watkins, 227 ft. 6 in., 22nd Regt. Armory, N. Y.

March 5, 1911, Leslie Robinson, 237 ft. 9 in., 22nd Regt. Armory, N. Y.
March 25, 1911, Stuart Easter, 263 ft., 22nd Regt. Armory, N. Y.

DISTANCE, RISING OFF GROUND (OUTDOORS).

April 1, 1911, Armour Selley, 211 ft., Brooklyn, N. Y.
Dec. 28, 1911, Percy Pierce, 412 ft., Philadelphia, Pa.
April 14, 1912, F. Hodgeman, 461 ft., Cypress Hills, L. I.
April 27, 1912, Dr. Carlton Dederer, 1,184 ft., Van Cortlandt Park, N. Y.
Nov. 5, 1912, George Cavanaugh, 1,400 ft., Oakwood Heights, S. I.
Nov. 5, 1912, Armour Selley, 1,408 ft., Oakwood Heights, S. I.
June 8, 1913, C. Obst, 1,432 ft., Brooklyn, N. Y.
June 8, 1913, Louis Bamburger, 1,542 ft., Brooklyn, N. Y.

DISTANCE, LAUNCHING FROM HAND.

May 7, 1911, Percy Pierce, 565 ft., Van Cortlandt Park, N. Y.
July 15, 1911, Harry McAllester, 760 ft., Van Cortlandt Park, N. Y.
July 15, 1911, Cecil Peoli, 811 ft., Van Cortlandt Park, N. Y.
July 22, 1911, Cecil Peoli, 1,691 ft., Van Cortlandt Park, N. Y.
Dec. 28, 1911, Percy Pierce, 1,814½ ft., Philadelphia, Pa.
April 3, 1912, R. G. Robinson, 1,895 ft., San Francisco, Cal.
April 27, 1912, John McMahon, 2,003 ft., Cypress Hills, L. I.
May 18, 1912, Armour Selley, 2,100 ft., Newark, N. J.
June 1, 1912, Armour Selley, 2,375 ft., Elizabeth, N. J.
June 23, 1912, Armour Selley, 2,653 ft., Mineola, L. I.

DURATION, LAUNCHING FROM HAND.

Sept. 9, 1911, Charles Lateiner, 48 secs., Van Cortlandt Park, N. Y.
Sept. 16, 1911, Cecil Peoli, 48 2-5 secs., Van Cortlandt Park, N. Y.
Oct. 7, 1911, Stuart Easter, 56 secs., Van Cortlandt Park, N. Y.
Feb. 25, 1912, Armour Selley, 58 secs., Cypress Hills, N. Y.
March 17, 1912, Harry Herzog, 65 secs., Van Cortlandt Park, N. Y.
March 17, 1912, Percy Pierce, 91 secs., Philadelphia, Pa.
Sept. 14, 1912, Carter Tiffany, 91 2-5 secs., Van Cortlandt Park, N. Y.
Oct. 12, 1912, Wallace Lauder, 92 1-5 secs., Oakwood Heights, S. I.
Oct. 12, 1912, Curtis Myers, 96 2-5 secs., Oakwood Heights, S. I.
Oct. 12, 1912, Francis Walton, 119 2-5 secs., Oakwood Heights, S. I.
Oct. 12, 1912, Armour Selley, 158 4-5 secs., Oakwood Heights, S. I.

DURATION, RISING OFF GROUND.

Sept. 21, 1912, Harry Schultz, 56 secs., Van Cortlandt Park, N. Y.
Oct. 20, 1912, Curtis Myers, 73 secs., Summit, N. J.
May 24, 1913, W. Bamburger, 81 secs., Brooklyn, N. Y.

DURATION, HYDRO-AEROPLANES.

Sept. 2, 1912, George A. Page, Jr., 25 secs., Van Cortlandt Park, N. Y.
Sept. 9, 1912, J. Billings, 28 secs., Van Cortlandt Park, N. Y.
Sept. 22, 1912, Armour Selley, 39 secs., Van Cortlandt Park, N. Y.
Sept. 29, 1912, Armour Selley, 53 secs., Van Cortlandt Park, N. Y.
May 30, 1913, George Cavanaugh, 60 secs., Oakwood Heights, S. I.

Dr. Carlton Dederer was the first to exceed 100 feet, Cecil Peoli 1,000 feet, and John MacMahon 2,000 feet in distance. Harry Herzog's model was the first to remain in the air over a minute, Francis Walton's over 100 secs.; and Armour Selley's over two minutes.

It will be seen that model flying has experienced the same development as have full-sized aeroplanes. At the time this table begins, a silver cup was being offered to the first whose model would fly more than a hundred feet. To-day a model flies twenty times that distance without exciting any comment. Five seconds in duration was once considered good. A hundred seconds, at least, is what a model is required to do at present. Furthermore the range of activities has steadily increased. Special contests for tractor, hydros, stability, etc., have only recently been inaugurated.

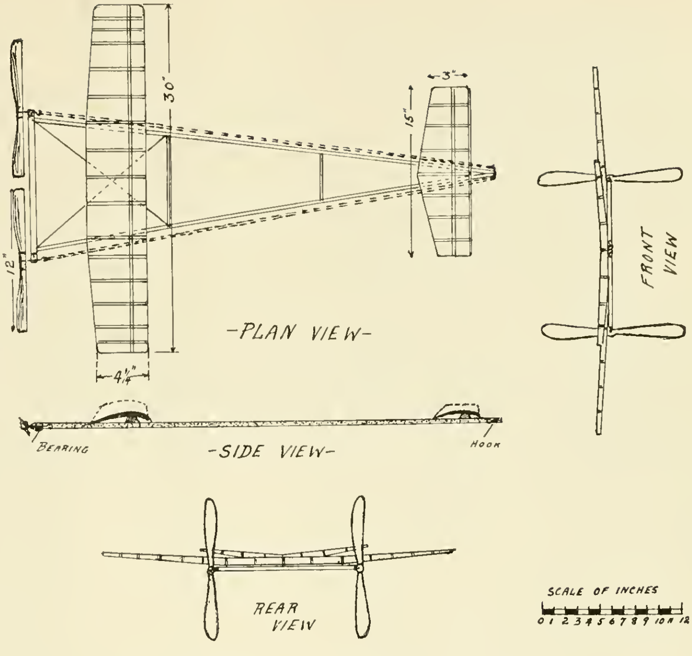
It might be interesting to show briefly how this development has been accomplished, and in what way the present day models are different from their predecessors of more than three years ago. It should help beginners to understand the obstacles which they must overcome before they are able to build and fly a model creditably, and enable them to profit by the experience of those who showed the way. Furthermore by studying the evolution of the model in the past, it should enable one to predict in some measure what the future holds forth.

As there was little to guide the pioneers in this field, the full-sized aeroplane was used as a model. However, this did not prove satisfactory, for reasons already stated in these columns. This was followed by attempts to evolve a special type. Various arrangements of wing surfaces, propellers, etc., were tried out. Some were tractors, some had screws in the rear, and still others had screws both in front and rear, turning in opposite directions on the same rubber band motor. One by one all other types disappeared in favor of the Canard or loaded elevator type. Two propellers were found necessary to overcome the torque, or tendency to turn the machine in the direction opposed to that of the propellers. This standardization of model design occurred before the end of 1910 was reached.

From thence the development has chiefly been in construction and in minor details of design. At first models were very heavy and clumsy. Model flyers were slow to see the necessity of having taut, neatly constructed wing surfaces, instead of a loosely joined frame work, covered with a wrinkled piece of muslin or silk. The great weight of the models, comparatively speaking, did not make them stronger, but, on the contrary, resulted in having them land harder, and more likely to breakage.

Slowly, by substituting silk thread in place of nails for joining together pieces, and other refinements, the models were lightened. Instead of having a bearing of ¼-inch brass, the size was reduced until the fine piano wire of up-to-date models was reached, sufficiently strong for their purpose. As models grew lighter, less rubber was used, the propellers turned slower, and more winds given to the motor, as a natural result. Another improvement was the discovery that by giving the rubber an initial stretch in winding up, the number of turns obtainable might be more than doubled. By the end of 1911, the final development along these lines had taken place, as represented in the model of Stuart Easter, the leader at that time. This model, though 32 inches long, weighed only 1¾ oz. as compared with the average weight of 12 oz. in the first year of model contests. Every useless piece of bracing was removed, the wings were extremely light and strong, double surfaced, with many other fine points of construction.

Since that time development has taken place not so much in a radical change of design, the standard model still being adhered to, but by developing a different type. In all early models the thrust of the propellers was very high. In fact, it was believed that a model, in order to be successful, must have a thrust at least equal to the weight of the machine. Thus a model was sustained in a large degree by the sheer force of the propellers. Many of the light models which were fashionable at the end of 1911 were little more than helicopters. Now, under the leadership of a few, notably Armour Selley, models whose thrust did not equal the weight of the machine began to be introduced. Larger propellers could thus be used, with no increase in the motors. This resulted in slower speed propellers, but with no decrease in the pitch speed, as the pitch of these larger propellers was higher,



-:SURINI MODEL:-

Scale drawing of the Surini model, a representative type of American model.

The Surini Model

THE FUSELAGE.

The fuselage of this model is forty inches long and the cross section of the main sticks are made by laminating two ¼-inch silver spruce sticks, which makes the main stick ½" x ¼", resulting in a very strong construction.

The rear-bearing stick dimensions are as follows: Length, 12½" and 7/16 x ¼" thick, oval shaped. The bracing consists of a piece of oval-shaped spruce ⅛ x ⅜ of an inch placed 29 inches from the front. To this are fastened the steel guy wires. A secondary cross bar is placed 15 inches from the front and measures ⅛" x ¼", oval-shaped spruce.

THE PLANES.

The main plane is built upon a ¼" square spruce stick 30 inches long. This is divided into three sections of ten inches each. The centre section has a chord of 5¼ inches and tapers to 4¾ inches at the tips. The outer sections are turned up a little for stability. In the centre the ribs are spaced 2½ inches apart and toward the tips they are 2 inches apart. This is covered on both sides with bamboo fiber paper and is given two coats of ambroid varnish; this gives the plane a smooth finish.

The elevating plane is built in the same manner as the main plane. The chief dimensions are: Spread, 15 inches; chord at centre, 4½ inches, and at tips, 3½ inches. The centre rib has a half-inch camber; then it gradually flattens out toward the tips. This is also covered with bamboo fiber and ambroid varnish.

THE PROPELLERS.

The propellers, which are 12 inches in diameter, are cut out of Langley type blanks of white pine, pretty well seasoned. The pitch is approximately 30 inches. After they are finished they are given the Charavay pattern and are driven by 16 strands of flat rubber at about 600 revolutions per minute.

The official duration record for this model is 80 seconds, with a distance of over 2,000 feet, unofficial.

The weight of the model is approximately six and one-half ounces.

A. M. SURINI.

However, in nature it is impossible to get something for nothing, so that modelists, to offset the reduced thrust, were compelled to use larger surfaces. These influences, reacting on each other, have resulted in the model of to-day. The highly developed models of such flyers as Selley, Lauder and Herzog have a thrust, even when fully wound, that is but a fraction of the total weight of the machine. The propellers revolve very slowly, as low as 250 revolutions per minute. Averaging in weight between 3½ and 5 oz., they carry almost two square feet of surface. They climb very gradually to great heights, in marked contrast to the models of former times, which, when released, would shoot up almost perpendicularly and quickly unwind. The propellers are all large, between 11 and 15 inches, with the pitch between three and four feet. Instead of having a six or seven inch propeller wound up a great number of turns, to-day they use less turns, but a much larger propeller, which more than makes up this decrease, brought about by the addition of more rubber.

It is no easy matter to build and fly a model of ~~this~~ latter-day type. They represent the result of years of practical experimentation on the part of their designers, who, in addition, have profited by the experience of each other and hundreds of other modelists.

While a beginner need not repeat the trials of these pioneers, he must be prepared to begin gradually, by building models that have medium thrust, medium sized propellers. He must not be too easily discouraged, if his first machine does not come up to expectations, remembering, as the table shows, that progress was slow and gradual.

FORMULA FOR WINDING RUBBER.

The following is the formula for determining the amount of turns which can be obtained from a given quantity of rubber:

Let C represent the constant, depending on the size of the rubber skeins, L the length of the rubber in inches, N the number of strands and R the number of revolutions, thus

$$R = \frac{C\ L}{\sqrt{N}}$$

For the ordinary ⅛" flat rubber the constant can be taken as equal to a 100, that is, single strand of this rubber, one inch long can safely be given a 100 revolution. Applying this formula, to a rubber motor 36 inches long, consisting of 16 strands of this rubber the revolutions will be found thus:

$$R = \frac{100 \times 36}{\sqrt{16}} = 900$$

Experienced flyers often take as high as 115 for the value of constant.

The constant for 1/16" square rubber is about 90, and that for 1/8" square about 55.

Everything for the Model Maker

Everything imaginable in the way of supplies and scale models, is listed in the new 48-page catalogue of the Ideal Aeroplane & Supply Co. Models to scale may be had of the well-known types of aeroplanes, even to the latest Curtiss flying boat. This is a surprise catalogue.

NEWS IN GENERAL

By D. E. BALL

Hempstead Plains

There has been a lot of excellent work done by the Moisant students during the past month. C. Murvin Wood, who recently flew from the Hempstead Plains aviation field to Washington and who is without doubt one of the very best aviators on the American continent, is now the chief pilot for the Moisant school, taking the place of S. S. Jerwan, who recently resigned. Mr. Wood makes a splendid instructor and has been getting exceptionally good work out of the pupils. Capt. Dante Nannini and S. Gordon had no difficulty in taking their pilot licenses and then continued to practice at the school in altitude flying and volplaning. Both of these men have shown remarkable capabilities as flyers.

Mr. Alfred W. Lawson has been making circles and figure eights on the 50 h. p. Gnôme-motored Moisant-Blériot. John McCue has been getting in a lot of good practice in straightaway flying and is about ready to begin circular work.

Two new students joined the school during the past month. One is Charles R. Michel, of Pachuca, Mexico, and the other J. Norman MacPherson, both of whom started out to do grass-cutting work in the most approved fashion and who show the earmarks of becoming proficient flyers with practice.

Col. Baron de Merck, aide-de-camp du President Sic. Manuel Estrada Cabrera, de la Republique Guatemala, C. A., recently visited the Hempstead Plains aviation field in the interest of his government, and was agreeably surprised at the great activity shown among the various flying corps. He was ably looked after by Mr. Charles de Peloggio, the general manager of the Moisant Company, and J. R. Hall, the publicity man. The Guatemalan government has purchased two of the Moisant monoplanes for army use, and Capt. Nannini will be the general instructor of their army school when he returns to Guatemala next month.

SLOANE

Good progress was made by all of the students at the Sloane school during the past month. Carl T. Kuhl has been doing exceptionally good work both in flying and in obtaining knowledge of the construction of the Sloane monoplane and its motor. Willie Leuke, Charles W. Dunn, James H. Clark and Victor H. Miller have been doing circles and making figure eights and volplaning in a manner which demonstrated their natural talent for the work. Thomas Steptoe has been doing some good circular work and is almost ready to take his diploma. Alfred W. Lawson has made a great number of circles and figure eights during the month.

Antonio Neichol, the new student, has been doing some grass-cutting work, although he was handicapped by putting the machine out of commission for about a week and took an enforced rest while it was being repaired.

Mr. Guy Gilpatric and his able assistant, Allan S. Adams, are working hard to graduate all of the students before the cold weather sets in.

HEINRICH

The students of the Heinrich school had considerable practice during the past month, although the machine was put out of commission once or twice by slight accidents. George A. Page, Jr., and Fred Jacobs are now making figure eights and volplaning, while Mrs. Mary Sims has been making some long straightaway flights and will shortly be ready for circular flights.

The Heinrich Aeroplane Company has just completed a new passenger-carrying Heinrich monoplane equipped with a new 6-cylinder 50 h. p. Herbert-Evans motor. Mr. J. S. Herbert, M. E., who, by the way, was the first student at the Sloane school, is now head of the Herbert-Evans Company, of Pittsburg, who manufacture the Herbert-Evans motors. Mr. Herbert spent a couple of weeks at the Heinrich factory in Baldwin installing the motor in the new Heinrich monoplane.

BECKWITH.

Mr. Beckwith and Mr. Crabtree continue to experiment with the new military type tractor biplane and both of them have been making short flights whenever the weather permitted. Mr. Beckwith will shortly try out one of the new Herbert-Evans 80 H. P. motors in this machine. Mr. Beckwith had thought some of buying a high-powered foreign motor, but his patriotic spirit dominated him to the extent of sticking to American made motors.

The art of flying and the science of construction is a hobby with Mr. Beckwith who has been experimenting with various types of flying machines for the last three or four years. He spends all his spare cash in this way instead of squandering it in the usual recreative pursuits. If there were a thousand men of the same calibre as Mr. Beckwith in the United States, the aeronautical industry in this country would be on a much better foundation than it is at the present time. There is no doubt that Mr. Beckwith will eventually make his mark and it is to such men as he and his very able assistant Mr. Crabtree that the movement owes so much for its development not only in this country but throughout the entire world.

Pennsylvania News

By W. H. Sheahan

The monthly balloon ascension of the Aero Club of Pennsylvania's large balloon, Pennsylvania II, was made from the Holmesburg grounds the last week in August. Pilot Atherholt was in charge, with H. Harrison Smith and John B. Newbold, Jr., as passengers. Ascending in an almost still air to an elevation of about 5,000 feet, a brisk breeze caught the big bag and wafted it rapidly eastward. Word was received later the same day by President Wynne, of the Pennsylvania Aero Club, that a safe landing had been made in the vicinity of Sea Isle City, N. J., and that an elevation of 9,000 feet had been attained as the aeronauts passed over Lakewood, N. J.

At West End Park, Mahanoy City, on September 2nd, DeLoyd Thompson, the celebrated aviator, met with misfortune when he lost control of his machine when at a height of 300 feet; falling to within twenty feet of the ground, he partially regained control and jumped. The plane crashed into a nearby fence, but Thompson escaped without serious injury. This was the first of a series of flights which Thompson was to have made during "Old Home Week," and the accident was a great disappointment to the thousands that had assembled at the Park. Owing to the condition of his machine, Thompson abandoned the project and left for his home.

Dr. Thomas Eldridge, as pilot, with several friends as passengers, made a balloon ascension from the golf grounds of the Philadelphia Athletic Club, near Manoa, Pa., during the latter part of August.

Balloon ascensions in and around Philadelphia seem even more popular than aeroplaning. Nearly every month at least one ascension is made and during some months, between the balloons of the Aero Club of Pennsylvania and the Philadelphia Aeronautical Recreation Society, three ascensions have been made.

O. E. Williams, of Scranton, flew at Asbury Park, N. J., with a biplane of his own construction during the meet held there the latter part of August.

Celebrating the anniversary of his first Philadelphia to Atlantic City flight almost to the day, Grover C. Bergdoll, on August 15th, repeated the performance of a year ago. Leaving the Aero Club grounds early in the morning, he made a most successful cross-country flight of the seventy-odd miles in one hour and fifty minutes. He had expected to take his mechanician, Charles Kraus, Jr., with him as a passenger, but owing to the weather conditions, he made the flight unaccompanied. After the first ten miles of flying he encountered a head wind which greatly retarded his progress. His highest altitude was reached when near Hammonton, N. J., when his barograph registered 8,000 ft. Upon his arrival at the Atlantic City beach, owing to the bad air currents which came in gusts from between the large hotels, a landing was effected with considerable difficulty. Bergdoll, shortly after landing on the beach, reported that the trip had been a most successful one. Bergdoll remarked: "The motor worked perfectly the entire distance, without a miss. The air was cold, but a wrapping of newspapers beneath my coat kept me comfortable, and the thrill of flying, once I was on my way, soon made me forget that it was chilly. Flying certainly has something on motoring." It was the intention to continue the flight to Asbury Park, N. J., then on to Trenton and then back to Philadelphia, following the Delaware River, but owing to the fact that Bergdoll was anxious to return his plane to Philadelphia in perfect condition and make preparations for his attempt to break the American altitude record with a passenger, his machine was towed back to Philadelphia by auto. Owing to the short time left in which to arrange matters for the altitude tests, they have been abandoned for the present and Bergdoll and his mechanician, Kraus, have sailed for Paris, where it is his intention to purchase the speediest "Dep" that can be obtained, and, if possible, represent America in the coming Gordon Bennett to be held at Rheims, France, September 29th.

Dayton, Ohio

The work at the Wright School at Simms Station has been continued steadily, and one of the recent graduates of the school who demonstrated excellent ability in his lessons was Mr. A. B. Gaines, of New York City. Although Mr. Gaines got to the stage where he was flying alone in fine form, it was necessary for him to return to the city before taking his pilot's license. However, Gaines is to continue work on the aeroboat next spring.

At present there are training at the school under Oscar Brindley's expert guidance Mr. Lindop E. Brown, of Glasgow, Montana, and Mr. H. M. Rinehart, of Dayton, Ohio.

While the school work has been progressing steadily in this way, one of the new model "E" exhibition machines has appeared at the field, and under the expert guidance of Mr. Orville Wright, on September 3rd, a few hours after leaving the factory, was in the air on its initial flight, climbing with plenty of reserve power and showing up a good speed. This machine is of the single propeller type, the first one of the products of the Wright factory to be so equipped, and the comparison of its performances with that of the two-propeller machine is even more interesting and instructive than the technical staff of the Wright Company had anticipated. Many exceedingly important features have been brought out, and Mr. Wright is spending a good deal of time flying this machine in various kinds of weather.

Complete details of this type will be issued in a short time. Its chief features are the ease of knocking down and packing in boxes for cheap shipment from place to place, and also that the size of the sections themselves are such that if complete knocking down into boxes is not done, the sections of the machine can be placed in an express car. This so greatly facilitates the getting around from place to place in making exhibition dates that those familiar with this field, who in recent visits to the factory have inspected type "E" are most enthusiastic, and forsee in it exactly the type of machine that they require in their work.

The tests that are being made now will continue for some time, so that this type will be standardized and ready for the road long before next spring.

Many exhibition flyers and managers are expected at Dayton to view the performances of this

machine later in the fall. "when it has gone through the mill" of the thorough tests and experiments that it is being put to.

Bath, N. Y.

The Thomas Brothers' aviators, who took part in the Perry Centennial celebration at Put-in Bay, returned to Bath after a most successful meet, notwithstanding that the weather was not altogether favorable. In fact, the weather was extremely bad upon the first, third and fourth days of the meet, but Mr. Johnson and Mr. Burnside gave excellent demonstrations upon the second day and each made four good flights on the last day, although the weather was still bad, and the balance of the contract was completed on the Sunday and Monday following, August 31st and September 1st. The committee of the Perry Centennial were greatly pleased, and although the contract did not call for an extension privilege, the opportunity was offered to the Thomas Brothers without any counter propositions, so that not only were the Thomas machines demonstrated to a large crowd of sportsmen, but the Thomas Brothers were able to completely fill the engagement without any cash deduction. The most notable man carried as passenger on the Thomas flying boat during the meet was Mr. Roy Henry Robinson, of New York, the son of Mr. J. C. Robinson, who is building the Perry memorial monument. Mr. Robinson was greatly pleased and wants to do some more flying in the future.

Mr. Burnside had an accident on the first day. After making a beautiful flight and landing perfectly on the water with his motor entirely shut off, as he supposed, he attempted to get out of his seat to stand on the end of the pontoon to prevent his machine from drifting into a dock a short distance away, when his coat caught upon the throttle and in some way entangled him so that he could not stop the motor, which forced the hydro at full speed into the dock. Burnside, however, was uninjured, although his hydro was somewhat smashed. It was put into condition, however, for the next day's work.

On Labor Day Walter Johnson gave a successful exhibition with the new Thomas metal flying boat at Conneaut, Ohio, and during the first week in September he filled a successful engagement at Rome, N. Y., using one of the standard Thomas biplanes.

During the first week in September Frank Burnside filled an engagement at Watertown, N. Y., with a Thomas biplane, and Ralph Brown filled an engagement at Riverside Park, Springfield, Mass., with the Thomas hydro-aeroplane, while Fred Eells flew at Monessen, Pa., with a hydro-aeroplane.

The students at the Thomas school are progressing very nicely. "Turk" Minnerly is the chief instructor at the school and has proved to be well adapted for the work. John Martin, of Utica, otherwise known as "Jip the Blood," is doing good work and promises to become a very clever flyer. Ralph Stuart, from Newport News, Va., whom the boys designate as "Lefty Louis," is also making good progress. Percy Van Ness is doing excellent work on the 50 h. p. Thomas biplane; he will be ready for exhibition work within a very short time. Irving Connelly, from Buffalo, N. Y., is about ready for his pilot's license. He recently made a splendid cross-country flight from the school grounds, over Bath, and landed at Avoca, several miles away, where he attended a dance and returned the following day.

Western News

By E. R. Cary

Frank Champion, the versatile pilot of monoplanes and biplanes, has been using a Blériot type in his Oklahoma engagements. Mr. Champion filled successful engagements at the Lexington, Neb., Fair on Sept. 10-11-12, and at North Platte, Neb., on Sept. 17-18-19.

It is reported in the Denver papers that Mr. Bowersox, the Wright pilot, is waiting for favorable weather to fly around Pike's Peak. Mr. Bowersox was formerly a postal clerk at Colorado Springs.

A. K. Lougren, of Topeka, is filling numerous dates in the middle West with his usual skill and good luck. We understand he is now using Curtiss motors.

Dr. Singer, of the Colorado Fuel and Iron Company's hospital staff, writes that while at Düsseldorf he enjoyed a trip in one of the Zeppelin passenger excursions. He was much delighted with the trip and said that the roar of the motors was a not unpleasant "buzz" when they were above the earth. A speed of nearly forty miles per hour was maintained.

The necessity of the pilot sitting in a safer position has been brought home again by the death of one of our military aviators. Tractors have proven dependable, are easily handled and hold many American records. Why should a man want to sit beside, let alone in front, of the engine, which is not in accordance with the common principles of safety any more than that the engineer on the running board or pilot of the engine or auto driver sitting on the radiator would be considered safe and sane. Latham said, "Let the sticks smash first," when asked his preference for high mounting on the Antoinette.

Frank Champion dropped a letter into the grandstand at Loveland, Col., addressed to Governor of the State, the guest of honor.

So far as aviation is concerned, Guatemala has assumed a position in the ranks of progressive countries. Its President, Excmo. Sr. Lic don Manuel Estrada Cabrera, who has always been interested in the progress of that republic, realizing the value of aeroplanes as instruments of war, is to organize an aviation school in Guatemala City, which will be the first in Central America.

Dante Nannini, whose photograph is shown above seated in a Moisant monoplane, and who was graduated recently from the Moisant Aviation School, will soon depart to Guatemala where he will take charge of the aviation school. Mr. Nannini will be the first aviator of Central America who will fly over the tropical lands of the western neighboring Republics and he intends to establish records in the way of progress to his country.

California News

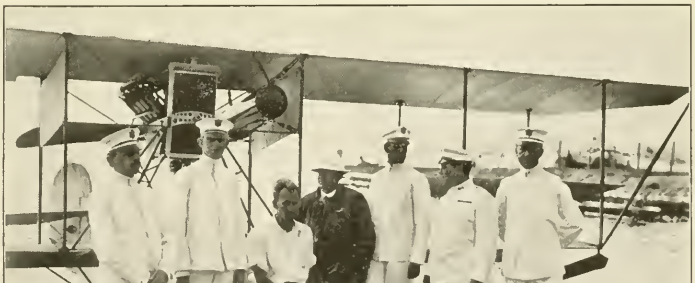
By R. H. Blanquie

A monoplane differing in many important details from other existing types has been conceived and constructed by J. A. Hoffman, son of a former United States Circuit Court Clerk of San Francisco. The craft, which was built in Los Angeles, was brought to and set up in San Francisco, where it is awaiting a special engine which is to develop 60 h. p. The chief point of difference from other monoplanes is its general shape, which resembles that of a huge mosquito. The most striking feature of the machine is the mode of attachment of the wings to the body. The plane is placed above the bullet-shaped fuselage on pivots, thus enabling it to retain its equilibrium no matter what the lateral position of the body may be and thereby insuring great stability. The wing tips are not automatically operated. The wing spread of the machine is 45 feet and the length over all is 35 feet. This aeroplane, due to its unusual construction, has aroused a great deal of interest among local aviators and many of them predict its success.

San Diego had sincere hopes of being chosen as the site for the proposed big army aviation school, but has been rejected on account of its isolation by the Chief of the Signal Corps. He has made a recommendation and submitted specifications for the establishment of such a school, which will be the central point for the training of military airmen at Fort Sam Houston, Texas. San Diego was found to be an ideal place so far as climatic conditions are concerned, but being separated from the men of the service, the chief signal officer thought that much of the school's utility would be lost.

Allan Lougheed has been making flights over San Francisco Bay on his Alco tractor hydro-aeroplane. On one occasion he carried as passenger a prominent society woman of San Francisco and flew with her over the Pacific Mail liner "Siberia," inbound from the Orient, causing much excitement among the passengers.

Miss Florence Seidel, who has the reputation of being the only water-planist of the fair sex in this country, recently made a test flight at Balboa Island in preparation for a trip she intends making shortly to Santa Catalina. She hopes to be able to make the crossing in a very few hours. A motion-picture man will accompany her and record the views of the journey.



Members of the Provisional Aviation Battalion inspecting the Curtiss Flying Boat at Manhasset Bay, L. I. From left to right are: Mortimer Delano, William Bouldin, 3d, J. A. D. McCurdy, pilot; J. W. Scott, T. H. Brideman, Kendall Banning, and Jerome Kingsbury, M. D.

The above illustration shows the effect of a searchlight dropped from an air craft, disclosing troops to the airmen. To quote from the *Illustrated London News* for which paper this drawing was made by Mr. H. W. Koekkoek, "there was tested at Farnborough recently an ingenious, yet comparatively simple, 'searchlight' for use by airmen flying in aeroplanes or dirigibles, and desirous of spying out the land by night without unduly exposing themselves or their craft. Twice a balloon ascended to a height of about 1,500 feet, and on each occasion it dropped a tin 'box' some two feet long. Immediately a little parachute attached to the device opened, and at the same moment there burst forth a strong and steady light. This illuminated the ground below for approximately five hundred feet, the area revealed diminishing, of course, as the 'searchlight' fell towards the earth, which it reached in about three and a half minutes, the period for which the illuminant is timed to act. It is claimed that by this method airmen will be able to locate any troops or other objects within the lighted area without running great risk, for the falling light must blind momentarily the enemy on the earth, and before he has recovered sufficiently to take reasonably good aim, the air craft, traveling at high speed, will have moved out of danger."

Curtiss Notes

The latest Curtiss flying boat for the United States Navy completed its official tests on August 14th, under the observation of Capt. W. Irving Chambers, U. S. N.; Lieut. H. C. Richardson, naval constructor, U. S. N., and Lieut P. N. L. Bellinger, U. S. N. Most of the tests were made by moonlight This was not done because the officers wished to fly at night, but principally because the specifications demanded calm weather for certain trials.

In addition to an unusual equipment of instruments, about 300 pounds of oil and gasoline, the flying boat made the trial flights with a load of approximately 700 pounds. With this load an average of ten flights with and against the wind showed a mean speed of a fraction less than 60 miles per hour. Slow speed tests with the same load showed a mean speed of less than 50 miles per hour. Unofficially the same machine has shown a slow speed of less than 45 miles per hour, but the air was "bumpy" during the tests and it was not considered advisable to slow the flying boat to the limit. The gliding test proved a surprise, for, with motor stopped at an altitude of four hundred feet, the boat glided 2,800 feet before touching the water, and then was brought down purposely to avoid landing on the shore. With the load carried a gliding angle of not more than five to one had been expected.

Compared with the Curtiss flying boats the navy has used during the past year, the new machine seems very large. The hull has an extreme width of 50 inches, a depth of 46 inches, and a total weight of 500 pounds. Fully loaded for the tests the machine weighed approximately 2,400 pounds.

Hammondsport, N. Y., Aug. 16.—Flying nearly sixteen hours in two days and covering a total of upwards of 900 miles, Instructor Francis Wildman is nearly equal with Lansing Callan in the number of lessons given and in total mileage for the past two months.

Flying boat instruction is so much in demand that a new boat has been added to the school equipment. Even this leaves half a dozen on each of the boats, as well as the men who are working at San Diego, and those receiving private instruction at Chicago, New York, Providence and Detroit

WILDMAN MAKES REMARKABLE FLYING RECORD

Francis Wildman this week celebrated his first anniversary in charge of the local Curtiss camp. Wildman checked over his daily records and found that during the year he had made a total of 2,653 flights, during which he was in the air 457 hours ten minutes, or 27,430 minutes. He has traveled approximately 25,000 miles during the twelve months. In addition to regular pupils of the school Wildman has carried 104 passengers, a total of 17 hours 20 minutes. Test flights on government and experimental machines have totalled 34 hours, of which the longest flight was of 2 hours 17 minutes. More than 90 per cent. of his flying has been done in the school flying boat and the total cost of repairs during the year has been less than $50.

The flying boat is keeping all of the capable graduates very busy. Havens is still flying Mr. Verplanck's Curtiss boat; Elwood Doherty is in Detroit flying with Commodore W. E. Scripps, and will likely have charge of finishing Barton L. Peck's instruction. C. C. Witmer, who has charge of Harold F. McCormick's Curtiss boat, visited the camp recently and then bustled back to Chicago. John D. Cooper has sailed for Russia, where he will superintend the setting up of last month's shipment of machines to the Russian navy. On account of the scarcity of good men, it is likely he will endeavor to complete the demonstration of these machines in time to join Glenn Curtiss in England about the middle of September.

It is noticeable that these days the plums do not go to the spectacular flyers, but rather to the men who sit tight and study the game. Steady, conservative flyers, who thoroughly understand the machines and the motors, are the ones who get first chance at the big salaries and commissions that go with the flying boats.

HAVENS CONTINUES CRUISE

Beckwith Havens is making slow time on his flight in the Verplanck-Curtiss flying boat from Detroit to New York, not because the machine is slow, but because he has had so many exhibition engagements offered him en route. After landing in Toledo the local traction company made him a pleasing offer to spend a week at Toledo Beach. From Toledo he flew to Put-in Bay, where he took part in the Perry Centennial.

Between Put-in Bay and Cleveland Havens encountered very bad weather. He ran into a miniature hurricane just off the Cleveland Country Club, which he believes the worst weather any flying boat ever lived through. The wind was strong enough to blow the sail from a yacht near by as Havens alighted in the waves. As he started for shore waves washed completely over the machine, short-circuiting and stopping the motor. Havens and his passenger, W. C. Chenevert, of Detroit, managed to beach the boat after a struggle, with no damage beyond a broken panel.

TAKES FLYING BOAT TO LAKE GEORGE

J. Lansing Callan, a younger brother of the framer of the New York State automobile law, has been at Hammondsport watching the completion of a new flying boat being built for him, which he will take to Lake George. Callan expects to spend quite a vacation flying over Lake George, and possibly over Lake Champlain.

$1,000,000 for Aviation Centre

According to a late Washington despatch plans tentatively adopted for an army aviation centre at Fort Sam Houston, Texas, which include buildings costing about $180,000, are being considered by the chief of the Quartermaster Corps of the army, Major General Aleshire.

It also has been proposed to buy at least two non-rigid dirigibles, which probably would have to be purchased abroad, at a cost of $175,750 each, as no attempt has been made to manufacture the larger types in this country. A rotating hangar, costing $122,500, also has been recommended, and this, with sixteen automobile tractors, would bring the cost of the proposed plant and equipment, including provision for personnel, up to about $1,000,000.

War Department officials feel that the House Military Committee is disposed to be liberal, as a result of recent hearing on aviation held in connection with the Hayes bill for the establishment of an aviation corps.

Details for Aviation, Signal Corps U. S. Army

It is desired to invite the attention of officers of the Army to the status of aviation in our service.

At present the law permits the detail of 30 Army officers for aviation and provides an increase of thirty-five per cent. pay and allowances while on such duty. It is hoped Congress will enact legislation providing for further increase of pay and other advantages.

About ten vacancies are now existing. Applications for these will be given due consideration, taking into account the order of their receipt. The detached service law does not apply to officers on aviation duty. Experience in training officers for this duty has shown that it is advisable to limit the details to men not exceeding thirty years of age. The applicant should be certain of his fitness physically and temperamentally. This involves excellent eyesight, good hearing, endurance, quickness of action and presence of mind. Blanks covering these points may be obtained from the Chief Signal Officer, Washington,

D. C., on application.

While the present regulations and laws do not forbid the detail of married officers, in general marriage would be considered a bar to selection for aviation duty.

Officers detailed in the immediate future will be sent to San Diego, Cal., for instruction until they obtain their Military Aviator's Certificate, after which they will be sent to join the central flying station.

The Military Aviator will receive a handsome certificate signed by the Secretary of War and the Chief Signal Officer, and under existing regulations wears a badge indicating that he is a Military Aviator.

Army Tests in October

It is announced that October has been set as the month for the trials of the new military aeroplanes which will be held at Dayton, O., although the exact date has not been definitely decided. Lieut. T. de Witt Milling will be officially detailed to supervise the tests and it is probable that General George P. Scriven, Chief Signal Officer of the Army and other army officers will also attend. The new machines to be tested are: A Burgess military tractor, 100 H. P. Renault; a Wright biplane, 120 H. P. Austro-Daimler; and a Curtiss tractor fitted with a 140 h. p. Gnôme.

Flying Boats Outclass Speed Boats at Buffalo Meet

The Perry Centennial festivities during the first week in September at Buffalo, clearly demonstrated the superiority of even the present-day hydroaeroplanes and flying boats over the highly developed and expensive speed boats. Two of the leading speed boats sank in rough weather and their crews narrowly escaped drowning while the nearest approach to an accident to a water-plane was when Luckey's Curtiss hydro-aeroplane sprang a leak in its pontoon but was safely towed to shore and speedily repaired. The aviators who took part during the regatta were Glenn L. Martin with the Martin Aero-yacht, Beckwith Havens with the Verplanck-Curtiss flying boat, which he flew all the way from Chicago, A. J. Engels of Cleveland with his Curtiss hydro and W. E. Luckey of New York with a similar Curtiss. The Martin Aero-yacht and Curtiss flying boat naturally attracted the most attention but nevertheless the two small Curtiss hydro-aeros received a good share of attention for, in spite of the extremely rough weather, they too put up very good performances.

Martin in his Curtiss motored aero-yacht was a special attraction, for on several occasions he took up little Miss Tiny Broadwick, who jumped from his machine with a parachute.

In spite of the gale which blew on September 4 and which sank the speed boats "Kitty Hawk Sr." and "Oregon Kid," Glenn Martin and Luckey flew in the extremely tricky winds, although the commission assured them that they did not expect them to fly in such weather unless they cared to.

Jannus in His Benoist Flies at Grand Rapids

On September 2 Anthony Jannus in his 75 h. p. Benoist flying boat fulfilled a very successful engagement at Grand Rapids, Mich. He made four passenger flights at the finish of the exhibition, carrying as passengers Bert. Kenyon, Paul McCarthy, Miss Lewis and Danny Boon. He also made a special flight with Arthur W. Stace as passenger, after which the boat was taken down and shipped to St. Louis, where Jannus will give some demonstration flights and instruct recent purchasers of Benoist flying boats.

Rich Men Purchasing Water Planes

It is reported that both Vincent Astor and Edwin Gould, two multi-millionaire New Yorkers, following in the footsteps of Harold F. McCormick and Robert J. Collier, have purchased flying boats for their own use. Mr. Gould is said to have purchased two flying boats which he will operate at his home at Ardsley on the Hudson.

Harold McCormick's Flying Boat Carries Nearly a Hundred Passengers

It is announced that C. C. Witmer, the pilot of the McCormick Curtiss flying boat, carried as passengers during the month of August over 90 people, amongst them being most of Harold McCormick's friends, while during the first week in September no less than 28 passengers had been carried.

Tom Gunn Flies at Honolulu

During the latter part of August Tom Gunn, the American born Chinese aviator, gave a series of successful exhibition flights at Honolulu, Hawaiian Islands. He flew before a crowd of 12,000 people, amongst whom were Mayor Fern, of Honolulu; General F. Funston, General McComb, Colonel McGunneycle, of the United States Army, stationed at Honolulu, and Admiral Moore, of the Naval Command.

Gunn is on his way to take up his commission in the aviation corps in the Chinese Republic. He flies his own type biplanes equipped with the well-known Hall-Scott motors, and also a Hall-Scott motored flying boat.

United States Army Flyers Stationed in Honolulu

Lieut. Geiger, Lieut. Bereton and a force of fifteen mechanicians are now in Honolulu with an equipment of four Curtiss biplanes, the United States Government having established an aviation base at this point.

The Knabenshue Dirigible to be Given Another Tryout

The 150-ft. passenger carrying dirigible built by Roy Knabenshue, Pasadena, Cal., which, after its first preliminary trials, was deflated and returned to the works for alterations, has now been finished and should by the time this appears be making flights. Larger steering and elevator planes have been attached and numerous other improvements have been made which Knabenshue says will make the craft very much faster, safer and easier to handle.

Commodore Scripps a Flying Boat Enthusiast

William E. Scripps, the former noted marine enthusiast and owner of the Detroit *News* and Detroit *News-Tribune*, has a bad case of aeroitis. He purchased a flying boat from Glenn Curtiss last month and travels miles each day in it. Scripps handles the flying boat himself, but thinks it better to have a more experienced pilot with him for the first few weeks. Ellwood Doherty, his assistant pilot, complains that between flights he barely has time to eat and sleep. Another flying boat arrived recently for Barton L. Peck, a friend of Scripps, and Doherty says he expects to participate in a constant succession of day and night aerial regattas from this time on.

Sergeant Vernon L. Burge, of the Government Aero Corps at Manila, Philippine Islands. Sergt. Burge learned to fly the army Wright biplane under the tutelage of Lieut. Lahm and is a very active aviator.

Another Benoist Flying Boat Purchased

Another convert to the fascination of the flying boat is John Parsons, of St. Louis, who has just purchased a Benoist flying boat. Mr. Parsons will use his boat for trips between his country residence, Riverside on the Mississippi River, and St. Louis.

Havens Completes 1,500 Mile Flight

When Beckwith Havens flew to Buffalo on September 4th from Cleveland in the Verplanck-Curtiss flying boat he finished another lap in the longest cruising flight ever made in this country. He has traversed three of the Great Lakes (Michigan, Huron and Erie) from end to end, carried passengers by the score, averaged better than a mile a minute throughout, and had not the slightest accident.

On the way from Erie he passed Perry's flagship Niagara. Twenty-four hours later, when the Niagara approached Buffalo, Havens flew out to meet her and escorted the ship into the harbor. He also flew more than a hundred miles for the edification of visitors to the Perry Centennial exercises, making five flights in all. On one flight the flying boat was filled with flowers which Havens' passenger dropped onto the decks of the yachts and into the crowds on the piers. Taking a young woman as passenger, he flew out to the yacht Priscilla, tied the flying boat at her stern and went aboard for luncheon with Commodore Worthington, of Cleveland. Leaving the Priscilla with another young woman as passenger, Havens flew to the Yacht Club for instructions from the flagship Niagara.

Flying at Providence

Gerald T. Hanley, a wealthy sportsman of this city, on August 15th, made an interesting cruise in his flying boat around Narragansett Bay. Piloted by Raymond V. Morris, Mr. Hanley left the water at Providence, skimmed down to Newport. There he circled the harbor a couple of times, and flew across to Jamestown. After flying around the fleet of battleships at Jamestown, Hanley and Morris alighted on the water alongside the flagship, where they made a short call. A few minutes later the flying boat again slipped from the water and ran through the East Passage to Narragansett Pier. Leaving the pier, the flying boat made a couple of five-mile circles around the bay and then jogged back to Providence.

"I used to think an automobile a wonderful annihilator of time and space," said one of the voyagers, "but this machine makes an automobile look like a slow freight. With the best car in the world a man has to drive hard to average thirty miles an hour on the road, while with the flying boat he can average more than twice that, hour after hour, without the slightest discomfort."

Mr. Hanley's flying boat was designed for him by Glenn H. Curtiss, and it is a duplicate of one recently made by Curtiss for the Imperial Russian Navy.

Raygorodsky Trying to Interest Capital

Abram Raygorodsky, licensed pilot of the Aero Club of France, and now in this country, was a former associate and friend of Mr. Sikorsky, the inventor of the Russian "Le Grand" aeroplane, and Mr. Raygorodsky is in hopes that he will be able to interest American capitalists in the construction of large machines of the Sikorsky type in America.

Curtiss Sails for Europe

Glenn H. Curtiss sailed for England on August 30th on the S. S. Imperator. England, according to first-hand reports, is more interested to-day in air-boats than any other country on the globe. Sportsmen are as keenly interested as the government, and Mr. Curtiss has had many inquiries from individuals and concerns interested in manufacturing rights. Demonstrations of the 1914 model flying boat, a solid mahogany machine, with high forward deck, will be made in England. Manufacturing rights and patent matters, as well as demonstrations to sportsmen, will take Mr. Curtiss onto the Continent during October. From the Norwegian Peninsula to Turkey the European continent is interested in the flying boat, and as it and the single pontoon system in general are well protected by patents, there are many who want to see Mr. Curtiss.

The Aeronautical Society

The Aeronautical Society plans to give a big aviation carnival on Columbus Day, October 13th, at their grounds at Oakwood Heights, S. I.

The flyers who have so far agreed to participate are: Harry Bingham Brown, through A. Leo Stevens; Capt. Thomas S. Baldwin promises two flyers and possibly three; E. O. Williams will have his one flyer, Mr. Benedict, with a Curtiss type biplane; The Thomas Brothers have agreed to send one flyer. Those still considering sending one are the Benoist Aircraft Company, Sloane Aeroplane Company and the Curtiss Motor Company. It is just possible that in case the new Thomas flying boat, which is now being constructed for Alfred W. Lawson, is completed and delivered to him in time, that he may deside to fly over from New York to Oakwood Heights during the progress of the meet, and after paying his respects to the officials of the meet, return to New York again by the air route.

The numbers on the programme so far as they have been worked out consist, outside of flying, of a shooting contest with rifles at small balloons from the ground after they have reached a certain height and twenty balloons let off simultaneously for each contestant, trophies to go to the two best scores, the object being to prove the accuracy of markmanship in time of war against aircraft.

An automatically stable glider with a dummy figure, the machine being twenty feet wide, will be let off at an elevation of a thousand feet to prove the stability and what such a machine will accomplish when liberated without control and determine the distance that it may travel. This may be accomplished in connection with a hot air balloon and parachute demonstration or with a pilot balloon.

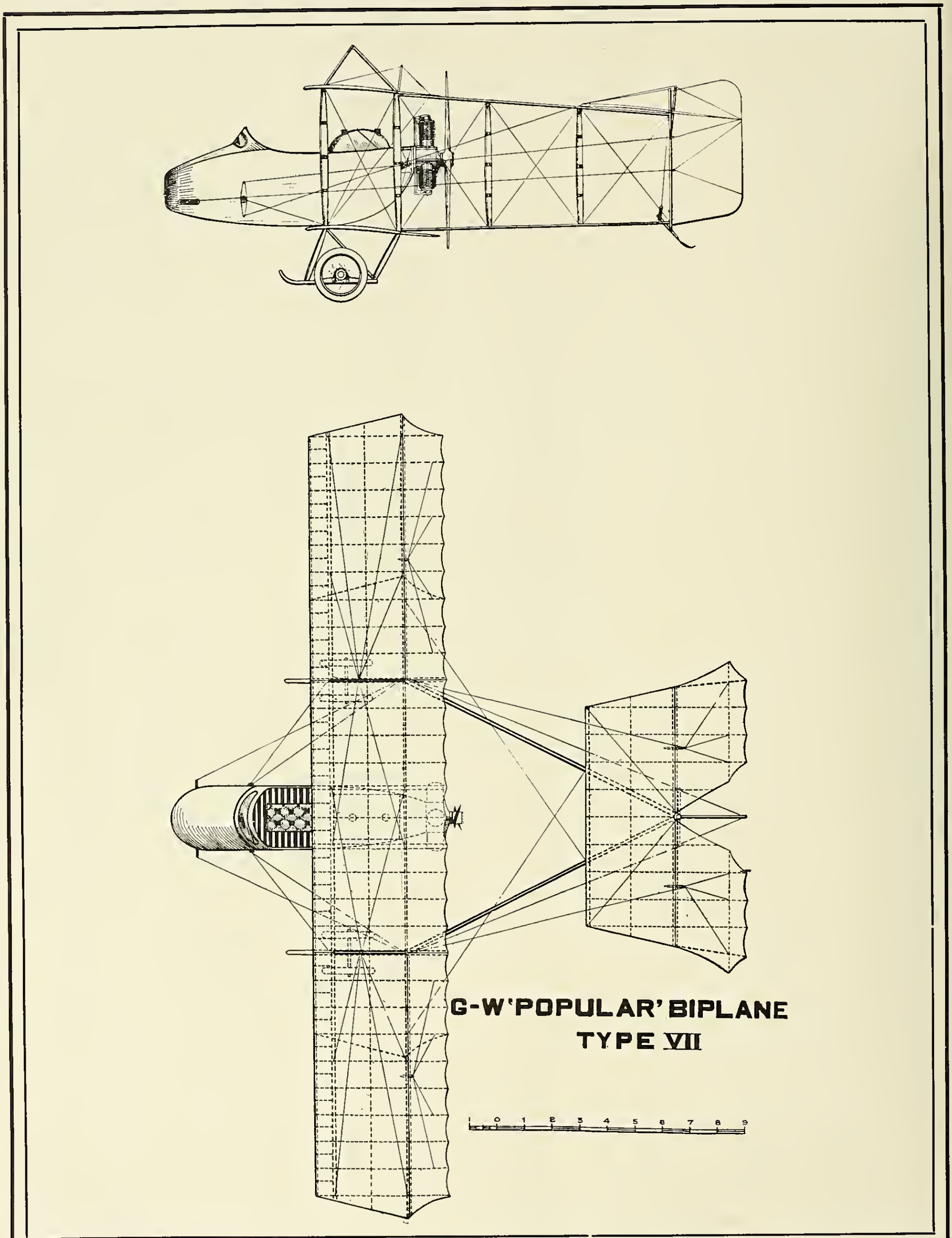
There will probably be a regular polo or auto polo game and possibly an aviette contest.

A prize is being raised in Staten Island for a race of about twelve miles as one interesting number on that day. In order to let everybody enter, there will be handicapping so as to make the race perfectly fair for all makes and classes of machines and motors.

A polo game for the flyers by using a fair-sized skin balloon that could not injure the propellers in case it should get in contact is being considered, but this is not a certainty.

There are a number of other plans in prospect

SCALE DRAWINGS OF THE 35 H. P. GRAHAME-WHITE "POPULAR TYPE" BIPLANE



Side and Top Views of the small Grahame-White Biplane designed for school work and short pleasure flights. It is fitted with either a 35 H. P. Anzani or a 50 H. P. Gnome.

and the occasion should be a memorable one in aviation in this section.

The Aeronautical Society is planning to give a series of important lectures during the coming winter. The first of these lectures took place at the Society's rooms in the Engineers' Building at 29 West 39th Street, on Thursday evening, September 11, when the following speakers addressed the members of the organization: Waldemar Kaempffert, managing editor of the *Scientific American;* C. B. Mills, chemist for the National Lead Company, and Alfred W. Lawson, editor of AIRCRAFT.

St. Louis News

By G. L. Holten.

Tony Jannus has been putting in all his time during the last six weeks flying exhibitions and demonstrating to customers the new Benoist flying boat.

He filled an engagement at the event of the Perry Centennial Celebration at Put-in-Bay. The weather was anything but ideal flying weather on account of the wind but the Benoist boat flew very steadily in quite heavy wind and proved quite seaworthy, flying the entire week without breakage of any kind. One day Tony made 14 flights, carrying passengers on ten of them. From there he went to the Celebration of the opening of the new power dam at Keokuk, Iowa, where for three days he made the speed boat owners and enthusiasts stand with their mouths open in wonder at the seaworthiness of this craft, as he was able to go out on schedule time each day regardless of wind and weather negotiating his landings and lightings on extremely rough water, one day being too tempestuous for any of the speed boats to venture out, and on these same days he would attain an altitude of 1,000 to 3,000 feet, apparently with the utmost ease.

Tony also filled two engagements at Reed's Lake, Grand Rapids, Mich., two days' flying to a small lake on the shore of which resides the President of the Association that arranged for the exhibition, this small lake being reached by a land jump of one-half mile and the lake itself being only 500 feet in diameter, thus showing the stability and accuracy in handling developed by this boat.

The Benoist Company have just completed a new tractor biplane along the same lines of the former Benoist tractor biplane, but incorporating a number of improvements, especially in the wings. This machine was tried out during the week of September 6th by Tony Jannus, and it was proved much superior to the former machine especially in gliding. To use Tony's own words, "the worst trouble he had with it was in getting it down to the ground after once getting up." The outlook for the future in this vicinity looks to be all toward the flying boat. A number of St. Louis sportsmen have become very enthusiastic about the airboat, two having purchased recently, and a number more are awaiting an opportunity for a demonstration.

The Benoist Company have been so busy turning out flying boats that they have not paid any special attention to securing exhibition dates at the fairs but to show that this line of endeavour is still profitable, telegrams are coming in daily of the most urgent nature for quotations, some from fair associations who find at the last minute they have been disappointed, but it seems to be more from the fair associations who had decided they could get along without an aeroplane exhibition this year, but find at the last minute that this feature of entertainment has been established in the minds of the patrons as something to be expected each year and the early fairs who had eliminated the aeroplane found their attendance falling off very materially.

The Benoist School of Aviation suspended during summer months but is preparing to open up by November 1st not only to teach the operation of the regular biplane, but the hydro-aeroplane and flying boat as well, and other plans are not entirely matured, but an announcement will be made by the next issue which all interested should not fail to consider as it will be about the most ambitious programme attempted by any aviation company in this branch of business.

Dr. F. M. Bell filled the engagement for the Benoist people at Lamar, Col. He had a thrill when his propeller burst some hundreds of feet up, and only his coolness saved him a smash. The crowd cheered him lustily upon his descent.

Harper's Aircraft Book, by A. Hyatt Verrill, $1. Fully illustrated. Publishers, Harper and Brothers, New York.

A comprehensive work which explains the making of model aeroplanes and the operation of large air craft, the keynote being practicability. While the primary object of this work is to teach its readers how to construct model aeroplanes and gliders, those interested in real man-carrying machines, or in the progress or advance of aviation, will find a great deal of valuable information presented in such a simple manner that it may be readily grasped and understood.

The Gas-Engine Handbook, Seventh Edition, by E. W. Roberts, *323* pages; 4¼x7; 85 illustrations; indexed. The Gas Engine Publishing Co., Cincinnati, Ohio. Price, $2.00.

This is a fully rewritten edition of this well-known work, which made its first appearance in 1900. In this edition, the author has given the reader the advantage of added experience and has treated the subject from the standpoint of the latest practice.

Taking the book briefly in detail, it is divided into three separate parts. The first part is descriptive, the second deals solely with design, and the third gives general information on the installation, care and selection of gas and gasoline engines.

Of more than ordinary interest is the chapter on the design of two-cycle engines. In fact this chapter in many ways lifts a veil of mystery from this subject. It gives not only the formulas for design but shows that instead of being an everlasting puzzle, the design of the two-cycle is a very simple matter indeed. The author has long made a specialty of this particular type of engine and the information given in this chapter is the result of experience.

There is a chapter on the design of aeroplane motors in which there is given a few simple rules for the design of engines of the light weight required in this service. The chapter deals with an up-to-date subject in a concise manner. While the author does not go into minute details on this subject as much as might be desired, it is touched upon in the chapters on the design of details.

Correspondence

Editor of AIRCRAFT, New York:

In AIRCRAFT of September, page 156-157, I see the article "The Question of Natural Stability in Aeroplanes," and the description of Dunne's inherently stable aeroplane. In this article it is said that Dunne, Fokker, Lohner, the German Albatross Arrow-plane, the Mars Arrow-plane and the Deutsche Flug Werke Arrow-plane and a great many others, employ more or less standard planes, set in form of a letter V (dihedral angle). Please allow me to call attention to the drawing, figure 3, 4 and 5 in my U. S. Patent 710266, of September 30, 1902, and also to the article in the *Scientific American Supplement* No. 1682 of March 28, 1908, "A new Aeroplane," where my Arrow-shaped monoplane, shaped like a letter V and without a tail, is shown. In the book "Progress in Flying Machines," by O. Chanute, C. E., printed 1899, already on about 19 pages the "Dihedral Angle" is mentioned, but it remained for other inventors to bring order in the chaos and point out the essential parts. That I antedate and have the priority over Dunne, Fokker, Lohner and many others, is proven by my patent drawings of 1902 and by my article in the *Scientific American Supplement* 1682 of March 28, 1908. With my aeroplane no further experiments could be made for lack of funds and likewise other now very much needed experiments concerning automatic balance, propulsion, etc., cannot be made for the same reason, respectively because there is no experimental station in America where inventors can get their inventions tried out without cost to the inventor.

Yours truly,

THEOD. GIBON.

Aviator Fred Parker has been engaged as instructor by the American Aviation Company, of Chicago, for the new school which they intend to open shortly at Gulfport, Miss.

Foreign News

(*Continued from page 181*)

Sweden

Before a deputation of Swedish officers at Buc recently, Bille was testing a Farman ordered by the Swedish government. With a full load of 280 kilogs. it rose 500 metres in 5½ mins. and easily fulfilled all the other stipulated tests.

Switzerland

On August 19 at dusk Bider on his Blériot was flying over Berne for 25 minutes.

TESTING THE TANDEM

(*Continued from page 175*)

A test such as I suggest could be made for not more than $10,000, and if carried through carefully will give a great deal of knowledge which ought to lead to a design so much safer than any that now exists as to alter completely the present commercial value of the flying machine. The tandem must be treated as a unit and control of the angle of incidence obtained by an elevator at the rear. Lateral control may be of any of the well known types but my own preference is for the reversed Farman, negative angle, system.

It is strange how long it takes for ideas that are different to sink into the brains of men. One would think that an examination of the force diagrams of the positive and negative angles would show the superiority of the negative angle, certainly so far as safety is concerned, but because the first machine to fly increased the positive angle of the wing which must be raised, other designers followed in behind and copied. It is only very lately that foreign students are beginning to see the fallacy of the positive angle. Some of them see it now; witness Berriman's articles in English "Flight," and Duchene's article in the July number of English *Aeronautics.*

Duchene has this to say concerning the positive angle: "The necessity of operating the warp in conjunction with the rudder therefore only results from a defect in the method of warping itself, which, as known at present, is a barbarous method." He is referring to the false turning movement set up when the positive angle, on the wing to be raised, is increased. This false turning movement constitutes what I call the fallacy of the positive angle.

COOKE AEROPLANES

Curtiss 1912 type a specialty (Pigeon Tail). My construction strongest in world; perfect fliers. Ten years' experience. Genuine Curtiss or Hall-Scott power plants; your choice.

Anybody Can Fly My Machines

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H. C. COOKE, Aeronautical Constructor

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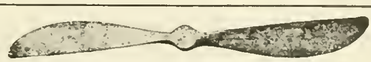

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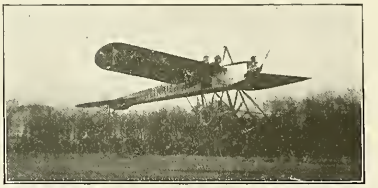

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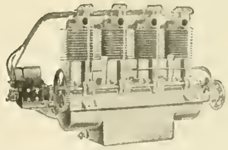

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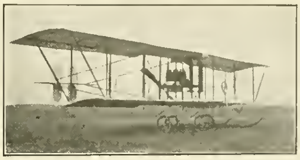

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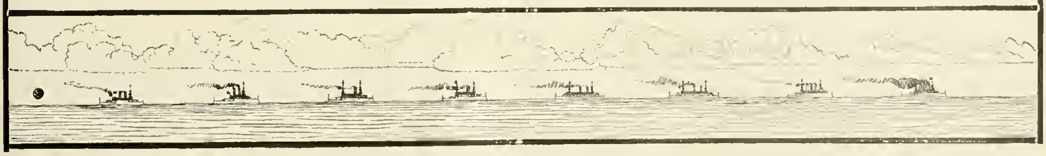

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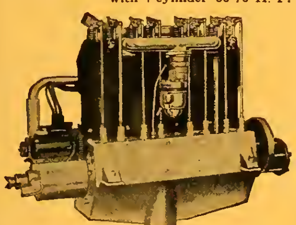

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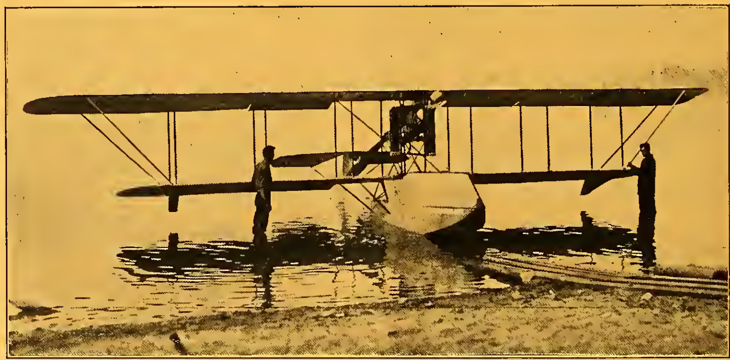

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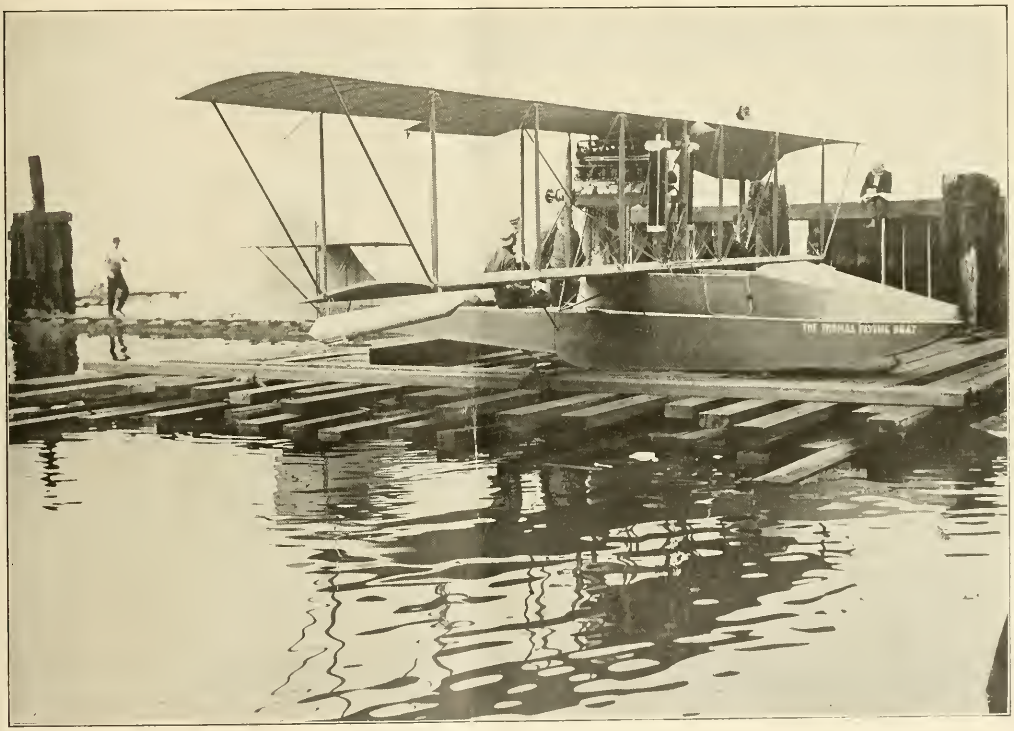

DOCKING THE AIR LINER

This picture shows, at its New York moorings, Alfred W. Lawson's new Thomas flying boat with which he "commutes" daily from his country home at Seidler's Beach, New Jersey, to his place of business in New York City.

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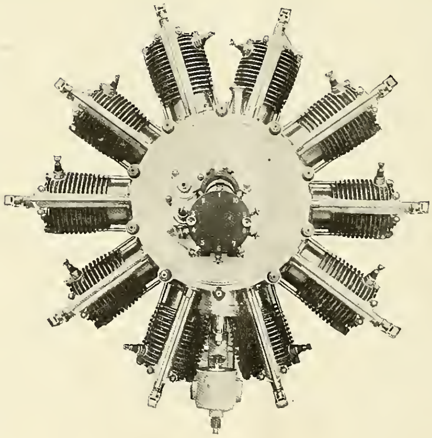

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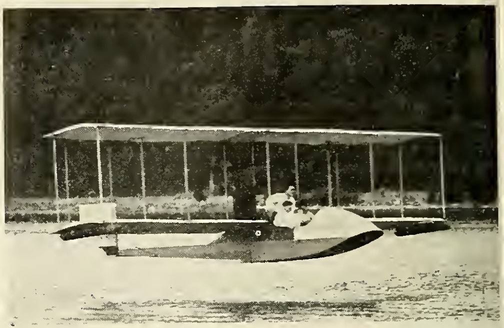

Antony Jannus, with two passengers, flying the new Benoist Flying Boat, equipped with six-cylinder

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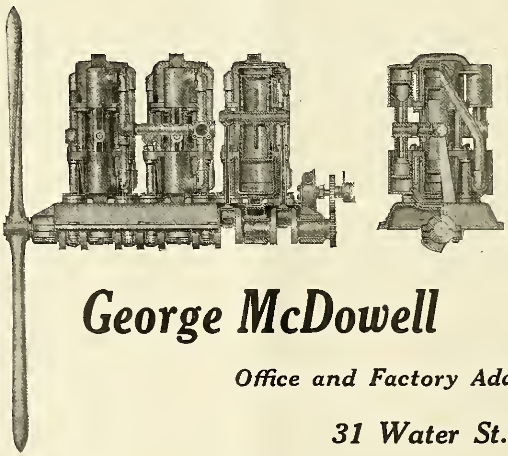

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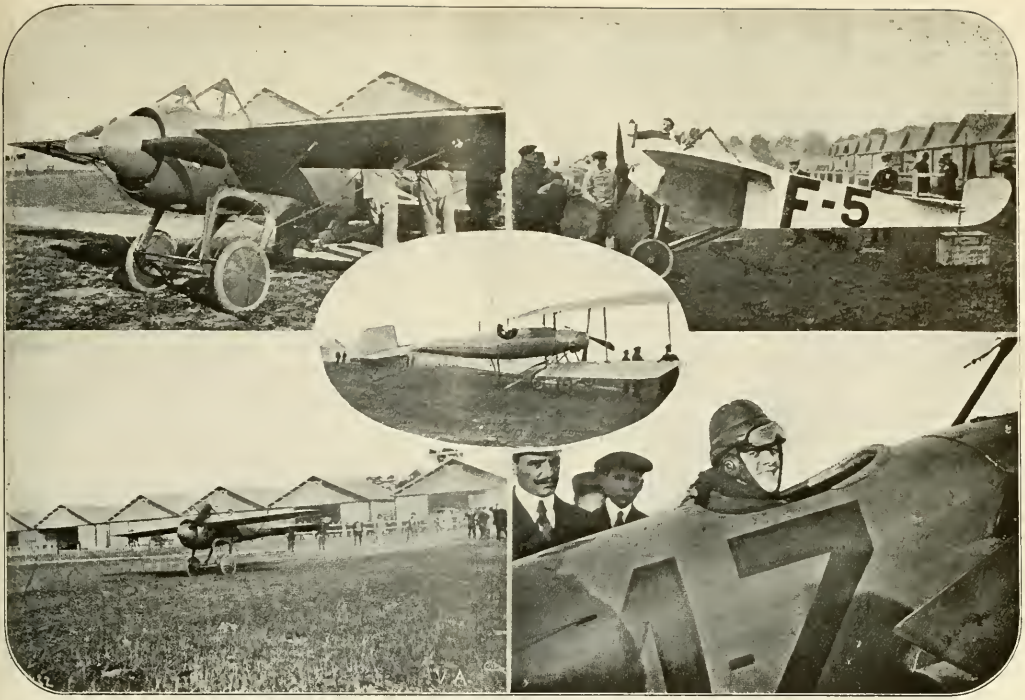

Scenes at the 1913 International Aviation Cup Race.

The left-hand top picture shows Prevost's (the winners) machine, which attained a speed of 125 miles an hour. The right top picture shows the little Ponnier (Hanriot) monoplane of Emile Vedrines which finished second. In the bottom left-hand picture Prevost is seen starting, while on the right is shown Crombez, the Belgian pilot, who finished fourth. The center insert shows the fast Breguet biplane which was entered in the preliminary trials.

CONTENTS—NOVEMBER, 1913

AIRCRAFT

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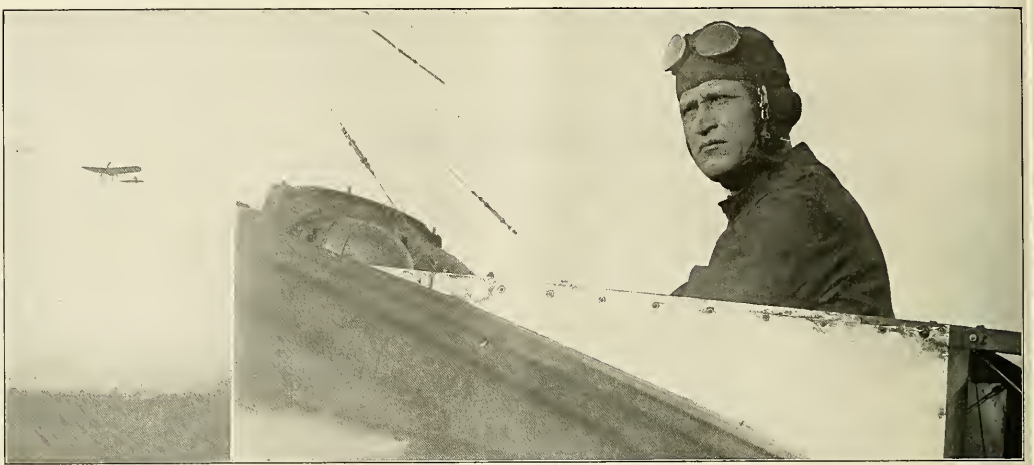
Alfred W. Lawson, the first New York Air Commuter, Flies Three Different Types of Machines.



Alfred W. Lawson in a 50 H. P. Gnome Moisant-Blériot Monoplane Making a flight at Garden City, Long Island.

On the morning of Friday, October 10th, Alfred W. Lawson became the first New York air commuter by flying from his country residence at Seidler's Beach, Raritan Bay, New Jersey, to the foot of 75th Street, North River, New York City, in a Thomas flying boat, covering a distance of 35 miles in 31 minutes.

Mr. Lawson is the first air commuter in the world who both owns and pilots his own flying boat.

Alfred W. Lawson Mounting a Sloane-Deperdussin Monoplane preparatory to making a flight.

AIRCRAFT

Vol. 4. No. 9 New York, November, 1913 25 CENTS A COPY $2.00 A YEAR

WAR AND AERONAUTICS

By DENYS P. MYERS

AVIATION as a practical thing is largely due to the existence of military armament, and at present the chief practical uses of aircraft are in connection with the land forces of the nations. Were it not for the certainty that armies in self-defense against the increasingly perfect armaments of other nations would have to employ aircraft as soon as they could actually get off the ground, it is doubtful if the pioneer workers would have persisted in the solution of the problems which made flying in heavier-than-air machines possible. To-day as many machines are employed in military service as in civilian work. And aeronautics as a fundamental feature of warlike preparation and war is recognized from "China to Peru," as the saying of our forefathers was. What uses aircraft have attained in war is therefore well worth examination. I shall deal with foreign facts, it being impossible to mention the subject in connection with the United States without being very uncomplimentary toward Washington and the Congress which perennially sits there and persistently remains blind.

The bald facts as to military aviation are being constantly reported in the news columns of this magazine and are generally known to the public, so that it is the purpose here to examine the broad aspects of the subject in two particulars: The actual value of aircraft in war and the prospect of success in the effort being made to prohibit their use as warlike instruments "of destruction."

Aircraft in war are susceptible of two uses, namely, for observation and for hostile attack, the latter being usually conceived as hurling of bombs. These uses are important in the order given, notwithstanding that bomb throwing has received inestimably more attention. Warfare of the present day is not so much a matter of fighting as of strategy in the field of operations and of tactics on the field of battle.

Modern war is not a matter of killing man for man, with the victory going to the army most successful at that devilish performance. It is a game of chess actually fought out far to the rear of the hostile forces in touch with each other by generals who sit at tables with large maps of the terrain before them, ordering moves of regiments as you move chessmen—and the side that makes the best move wins. A modern army corps does not need to be decimated to be whipped; it is beaten when out-maneuvered. It may lose many men or few, but if it is confronted by a larger force or out-flanked, it is *hors de combat.* All of this has much to do with the warlike uses of aviation, for this method of conducting a campaign depends on two things, vitally depends on: maps and information. Failing these, warfare reverts to the old custom of wanton killing; but every general staff in the world is feverishly working against that reversion. The Turko-Italian war, fought in Arabic Tripoli, was a veritable exception, and, though these outpost wars are more likely to occur in the future than any between two civilized powers, it is along the lines indicated above that military science is progressing.

Maps and information are fundamentally necessary. Aircraft are capable of furnishing both of perfect quality and in quantity dependent only on the aerial force at command. That possibility renders aircraft indispensable. The field of battle can be perfectly known, the disposition of enemy troops accurately reported. These divisions of aerial work correspond to the technical strategical and tactical reconnaisance on which the British War Office wrote in the instructions to the Royal Army Flying Corps previous to last year's maneuvers:

The value of information depends to a great extent on the length of time that has elapsed since the events occurred to which it relates. As regards strategical reconnaisance, a general is probably now justified in requiring a well-trained flyer flying a modern aeroplane to reconnoitre some 70 miles out and return 70 miles. This would be done at a speed of, say, 60 miles per hour in ordinary weather over ordinary country. Thus, within four hours, allowing a wide margin, a report as to the approximate strength, formation and direction of movement of the enemy if he is within a 70-mile radius should be in the hands of the commander. A similar result would probably take officers' patrols, sent out from the strategic cavalry, at least three days, while the prospects of acquiring the information would be less.

Tactical reconnaisance, to ascertain the enemy's position, the nature of the ground and the places at which to direct artillery fire, is just as efficient by aeroplane as the broader type. Aviators engaged in both will, of course, seek both information and map material, while during actual conflict they are to be employed in reporting the effects of artillery fire.

At first sight these uses of the aeroplane may seem very insignificant, but when one remembers that captive balloons have been used for these purposes and for no others in the siege of Paris in 1870, at Casablanca by the French in 1907 and in the Moroccan Rif by the Spanish in 1909, by the Bulgarians in the Balkans in 1912 it can be seen that military reason is on the side of what is said above. In Tripoli, Italy used aeroplanes for both scouting and offensive work, but gave up the latter. At the siege of Port Arthur in 1904-5 the Japanese used balloons to see into the city, the downfall of which was sounded when 203-meter Hill was taken. This hill was a fortified outpost beyond the real fortifications, and its capture was hailed as a great military feat and the beginning of the end. It was, but scarcely a shot was fired from it. The Japanese used it as an observation station, whence a Japanese officer was able to see the effect of every shot and the disposition of all troops in the city several miles away. That advantage sealed the fate of Port Arthur,

an advantage which the aeroplane gives to any army possessing it at any time under any conditions.

"In six months," says the London *Times*, "Captain Moizo made no fewer than eighty-two flights in Tripoli, Lieutenant Gavotti eighty, Lieutenant Roberti the same number, and Captain Piazza seventy, while many other airmen made numerous brilliant ascents. By means of these scouting expeditions the Italian generals were regularly apprized of the enemy's movements and strength, the country between the coast and the mountains was carefully explored, and its main features noted. This work was of the greatest assistance in determining the errors in existing maps, and furnishing details for the new *carte demonstrative* which have been compiled since the occupation."

Hostile uses of aircraft fall into two categories: attack against forces below and attack against aerial forces of the enemy. A great deal has been written of bomb throwing, but at present it is not of first importance. I understand the explosives necessary to make it effective are not yet invented. Present-day explosives act dynamically, I learn, upward and downward, whereas the really effective explosive for aerial use must work outward. Our present explosives, hurled from above, blown up or down on impact, those in range—a few men—suffering the consequences of their proximity. What is desired is an explosive working horizontally, one that will strike in the middle of a company and leave the men for rods around dead as its tribute to Mars. A bomb acting otherwise is about as dangerous as the shell of a big gun, though its application from above may get on the nerves more. For humanity's sake, it may be hoped that invention has reached its limits along this line.

Present-day explosives are of use in that development of war which has not yet been tried—actual aerial fighting. The Krupp gun for use against aerial forces has not been thoroughly tested, and it may be doubted if any means of offense employed from the ground will be really efficient against aircraft, if dirigibles and airships be excepted on account of their bulk. Casual efficiency in this respect is, of course, worthy of note, and there are facts to illustrate it. The aviator Popov with the Bulgarian troops in the Balkans was brought down by the Turks at Adrianople with shrapnel after rifle shots failed. "The aeroplane was seen to fall suddenly;" it may some time be known whether the aviator or a vital part of the machine was hit. In Tripoli the aeroplanes were hit on a number of occasions by rifle bullets and two airmen were hit, one seriously, though both were able to fly back to camp. On two other occasions the motor stopped and lucky *vols planés* brought the aviators just within the outpost lines. It may be deduced from this that bullets offer no greater danger to airmen than their own machines, if you care to make deductions.

But the time when the battle shall be fought in the air itself is the time for which military men are waiting—but not longing. Turkey, the belligerent in the last two wars, had only desultory use of aircraft, so that Italy and the Balkan States had things aerial pretty much their own way. But pit two armies supplied with aerial machines against each other and you will find the war transferred to the sky with the ground forces doing a maximum amount of looking on, perhaps. Present rules of warfare do not hamper the action of belligerent armies in conflict between themselves and this aerial war will be fought on primitive lines. Its object will be to prevent the enemy aerial corps from getting information or map material or to prevent its members reaching their own lines. No restrictions are existent on these points, so that we view the prospect of fighting without any of the conditions affecting almost all other types of warfare. Airmen will be able to use guns, quick-firers and bombs against each other, with the prospect of all being successful where they would not be in attacking airmen from the ground or vice versa. Any bomb that would explode on contact with a flying aircraft would put it out of business, and airmen whose vehicle was thus damaged would meet a death the more horrible because they might have some warning of their fate. This kind of war will literally be a case of human flyers going out to hunt each other, with the chase aided by more and more specially designed death-dealing instruments. The probability of such warfare is at present the only development of the application of aviation to warfare which need shock the humane-minded, though they have been howling up the empty tree of attack by bombs.

Such is the present application of aeronautics in warfare. Concurrently has come a movement against using the air or restricting its use. Very little of that movement has been based on sense, very much of it on sentiment in people who have not understood the exigencies of modern warfare. The Hague conventions have not restricted military action as between belligerents except in divesting it of gratuitous cruelty. A spy can be hung or shot if captured, but an airman probably is not a spy because he does not act clandestinely or under false colors. The Hague has fixed the definition and it has also provided that war must confine itself as far as possible to regularly constituted forces, thus eliminating the great cruelties once practiced on non-combatants because they were of the enemy side. The Hague has also provided for humane treatment of combatants who cease to fight, prisoners and wounded; but short of being in that condition the combatant is not engaged in a game of tag. The modern object of war is not to run a killing contest between armies but the putting of one army or another *hors de combat*. Putting an army in that condition is not a matter of going out and pinning a tag on a man, but it is going out and putting a bullet in him or whacking him over the head until he calls quits. Then you treat him like a human being. That is what The Hague conventions have done and about all that they can do. When hostile troops are in contact they must fight till a victor emerges, and no nation is going to sign off its opportunity to insure the victory by using the air.

Opposition to extending aeronautics to war has been along two lines, the proposition to forbid and the proposition to neutralize the air. Both are based on the same fallacy. They suppose that because we can fly the military uses of aviation are known. But aviation is an unknown quantity applied to war. Of immense use in scouting, that use cannot properly be greatly restricted. Air craft are of uncertain use for hostile purposes, and no nation is going to tie its hands in that respect unless overwhelming public opinion so demands. The nation that invents an explosive working horizontally will have a tremendous advantage over all others, and none is going to sign off such a prospect. Restriction of fighting in the air itself is not yet practical, because the thing does not exist and no one can predict what form it will take, whether it will simply be a murderous incident of war or the thing on which the whole conflict will hinge.

A Hague declaration of 1899 forbade the use of explosives from balloons. It was ratified for five years, and the period of prohibition expired during the Russo-Japanese war. So little did the belligerents value the privilege made possible to them that both agreed not to use explosives or asphyxiating gases from balloons during the rest of the war. The same declaration was re-enacted in 1907 to run till the next Hague Conference. It created much discussion and has not been generally ratified. The Institute of International Law last year voted a project for an aerial code in which the rules of the Declaration of London relative to naval warfare were generally applied to aeronautics. These are not generally restrictive, but are administrative in character. The Institute's work has not the force of law though it has great prestige.

Efforts to restrict in a general sense have come from pacifist sources. The English got out a protest against using bombs in the Turko-Italian affair, but the Italians beat them to it. For they found that so many of their bombs did not explode and were loaded into Turkish cannon and fired back that they gave up that scheme. On the initiative of the late Auguste Beernaert, Belgium's most distinguished statesman, the Interparliamentary Union at Geneva considered a proposition to appoint a committee to "study questions relative to the employment of aerial

navigation in time of war from the military point of view," and especially:

1. To examine: (a) If there is cause to bring about the conventional prohibition of the use of machines for aerial navigation, known or not yet invented; (b) if, in any case, such use is not to be reserved to the states, aerial privateering is to be forbidden, as is the case with maritime privateering; (c) if, on the hypothesis that use as an instrument of combat will be prohibited, there is cause, for purposes of military utility of authorizing operations of verification, investigation or control; of determining in this case the consequences of such use for the machines concerned, from the point of view of their own defense and of eventual hostility between them and for the protection of terrestrial or maritime regions thus exposed.

2. To study the budgetary consequences of a use of machines for aerial navigation, either as instruments of combat or as a means of reconnaisance.

This statement covers the ground but was not accepted, the council simply being invited "to learn the best means to secure a unanimous renewal of the declaration of 1899 by the next Peace Conference." The first resolution was thoroughly commendable, and it is to be hoped such a study will be made. Meantime aeronautics is being applied to war along the lines indicated by M. Beernaert.

PIONEERS OF AVIATION

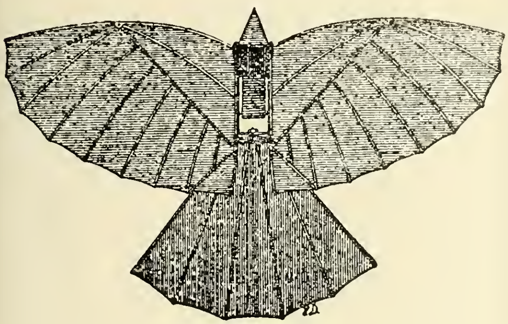
By LADISLAS d'ORCY

To the reader who would have a general knowledge of the history of air navigation, we suggest going back to Volume 1, No. 1, page 3, and reading the "Summary of Human Flight," which gives an insight into the inception of the movement.

Following this up he should then begin by reading the various articles by Ladislas d'Orcy, entitled "Pioneers of Aviation." Article I, entitled "Sir George Cayley," appeared in AIRCRAFT, *Volume 2, page 267; Article II, entitled "Samuel Henson and John Stringfellow," appeared in Volume 3, page 150; Article III, entitled "Felix and Louis Du Temple," appeared in Volume 3, page 179, and Article IV, entitled "Captain Le Bris," appeared in Volume 3, page 317.*

We intend to continue publishing the "Pioneers of Aviation" from time to time, so that the reader by preserving all of his monthly AIRCRAFTS *will eventually have a most complete history of the movement in every way.*

V. Count d'Esterno.



COUNT D'ESTERNO'S SOARING MACHINE, 1864

THE somewhat crude apparatus, on which Captain Le Bris first demonstrated the possibility of soaring flight, was followed in 1864 by a project of a soaring machine, that was extremely well conceived for its purpose and spelled considerable advance over anything that had been proposed so far. Its author, **Count d'Esterno**, was a great observer of bird flight, who had published in the same year quite a remarkable book upon that subject, "du vol des oiseaux," in which he tried to divide the mechanism of flight into the seven laws of flapping and the eight laws of soaring.

Although **d'Esterno** was not always on the right path with his deductions and especially not in his explanation of the soaring flight, a very great deal of credit is due to him for his pioneer work in defense of the aeroplane, which at the time being was looked upon as an absolute chimera. These were the days of **Nadar** and other helicopterists, who wanted to materialize dynamic flight by means of ascending screws; and the few who opposed them were only advocates of flapping flight, who denied even more strenuously the existence of soaring bird flight and condemned the aeroplane as a whole. But **Count d'Esterno** had seen soaring birds in action and was fully convinced of the possibility for man to imitate these evolutions, which he explains as follows:

"Soaring flight works under the drawback, that it cannot take place without wind; but on the other hand, we can derive from the wind, when it blows, an unlimited power and thus do away with any artificial motor. In soaring flight a man can handle an apparatus to carry ten tons just as well as one only carrying his own weight. Whoever has seen large birds of prey soaring upon the wind knows that without a flap of their wings they direct themselves as they choose, save when they want to go dead with the wind or dead against it, on which occasions they must either tack or sweep in circles."

To prove the justness of his theories, **Count d'Esterno** patented in 1864 a soaring machine, that consisted of two arched wings, shaped like those of the large soaring birds and a movable tail (See Fig.). So as to give this apparatus all of the flexibility the birds possess, **d'Esterno** made the wings rigid only within the triangles next to the car; the rest of the wings was flexible and capable of a torsional or warping motion, in order to increase or decrease the angle of flight. Automatic stability was to be effected by the airman sitting on a movable seat that was connected with the tail and acted on the latter in pendulum fashion; besides it the center of gravity could also be displaced at will, by giving the wings a fore or aft motion. The tail was mounted on a universal joint; it served for elevation and depression of the machine, while a lateral motion combined with a torsion was to secure horizontal direction.

For the start the machine was to flap its wings through a device actuated by the pilot; once in the air, propulsion was to be secured by the varying wind currents, which **d'Esterno** considered as sufficient for gaining sustentation and headway, by altering his angle of flight according to the circumstances. The dimensions of this interesting machine, which was never constructed, were the following: wing surface, 215 sq. ft.; spread, 15¼ ft.; depth, 7 ft.; total weight, 330 lbs.

Some time later, when the aviatic movement saw the failure of the helicopter and the flapping flyer, and experimenters became interested in **Mouillard's "Empire de l'Air"** and the theories formulated therein, **d'Esterno** was urged by members of the **French Society of Aerial Navigation** to build the soaring machine he had imagined in 1864. **d'Esterno** acceded to these demands and gave the plans of his apparatus to M. Jobert, an ingenious mechanic, who had already produced several successful flying machines, such as ornithopters; but before the soaring flyer could be terminated **d'Esterno** died in 1883 at the age of 77, and **Jobert** being unable to get backing from the **Society of Aerial Navigation** for the completion of the apparatus, discontinued further work.

EDITORIAL

TRICK FLYING MUST BE STOPPED OR THE AERONAUTICAL MOVEMENT WILL SUFFER IRREPARABLE INJURY.

THE trick of making a machine fly upside down and also of making it do various other antics for which it is not primarily intended for the sake of thrilling crowds of curious and morbid spectators who obtain their thrills by witnessing a man situated in a dangerous position with the odds in favor of him being dashed to death thousands or hundreds of feet below, is already beginning to show its doleful effects in America.

This country, more than any other country in the world, has been overrun by the air clown to such an extent that the movement has suffered from this menace to the development of legitimate flying as no other country has had to suffer, and to such an extent that the movement almost became wiped out of existence entirely, for it must be understood, first, that the morbid crowds who are thrilled by such performances are not the sort of people who will ever take up flying as a sport, science or industry, and, second, if there should happen to be in the audience ten or fifteen men who might have considered the advisability of taking up aviation as a sport, science or industry, by witnessing such feats they are immediately driven from the movement forever. They are frightened away from it just as they would be frightened away from taking up automobiling if the first and only demonstration they had ever witnessed of an automobile's qualities were shown to them by a loon in a circus making a loop the loop with it. One buys an automobile because of its capability of transporting himself from place to place in safety, and that is the only reason that any sane person will ever purchase flying machines, and these machines must be demonstrated to the public as safe vehicles of transportation and not as uncanny, death defying, trick instruments.

As I write, the morning newspapers inform me that Lincoln Beachey has just killed a girl and maimed one or two others during one of his "dip the death" performances while trying out a machine which, it was claimed, he intended to outdo all of Pegoud's performances.

Beachey has done more harm to the aeronautical movement in this country than any other individual. Beachey stated some time ago that he had retired as an aviator and would never fly again, and we wrote an editorial in the June, 1913, number of Aircraft, saying that with Beachey retired "the movement should make more substantial and rapid progress than ever before." Now Beachey has returned, and his first act resulted in a death, and the people all over the United States are talking about the terrible danger of aviation, while a great many people who might have taken up safe and sane flying have been frightened away from the movement.

The worst of it is the people usually point to these air clowns as being the best aviators. In fact, a stereotyped phrase is that all the best aviators have been killed, whereas the fact of the matter is that the best of the aviators are alive, and they are alive because they are the best aviators. The capable, sensible aviators rarely meet with accidents; it is the foolhardy who generally pay the penalty of their recklessness.

What railroad, do you suppose, would claim that its locomotive engineers were the best who met with accidents or the ones who had been killed, and still there would be as much sense in such a statement as there is in the oft repeated and absolutely ridiculous statement that all the best aviators get killed.

There are thousands of aviators in the world to-day who have been flying for several years and who have never received a scratch. The general public seldom hear of their deeds because they do not meet with accidents. They are the best aviators, however, and they are doing more for the permanent growth of aviation a million times over than the irresponsible, so-called, dare-devil sort, whom the newspapers like so much to exploit. This so-called dare-devil type of airmen have never made a real convert to the movement, but through their erratic performances they have driven many prospective converts from it.

These men go into a city and advertise themselves as superhuman beings, who flirt with death among the clouds and lead the population to believe that if they go out to the fair grounds and pay their fifty cents admission that they will have the treat of their lives by seeing a human being dashed to pieces after being hurled from his machine thousands of feet above the

crust of the earth, and the newspapers of this country abet them by publishing only such stuff and nonsense. Is it any wonder, therefore, that the United States is trailing along behind a dozen other nations of the world in its army and navy aivation, and that the people of this country have, as a whole, an ingrained idea in their craniums that the man who rides in an aeroplane is riding to his grave.

Therefore we say that there must be a united movement among those who have the real success of aviation at heart to stop these air clowns from doing any further damage. The air clown, who deliberately flies over crowds at low altitudes to show off his tricks, should be put in jail and debarred forever afterwards from flying in any manner whatsoever; the aviator who rocks his aeroplane with a passenger in it is no better than the fool who rocks his boat and spills his passengers to a watery grave, or the idiot who pulls the trigger of a loaded gun and then, after killing his victim, claims that he did not know it was loaded.

This class of men are the real detriment to the movement and must be gotten rid of, and the sooner the better.

We can get along in this country without the Pegoud buffoonery. We do not want upside down flights, but we do want plenty of good wholesome flying right side up.

USEFULNESS should be the keynote in flying from now on, for that is the only foundation upon which the permanent success of the industry can be built.

FLYING MUST APPEAR EASY AND USEFUL OR THE PEOPLE WILL NOT TAKE IT UP.

THE recent Meet held under the auspices of the Aeronautical Society, proved to be one of the most interesting and spectacular events of its kind ever held in this country, and it points the way to new methods being adopted by American aerial promoters in the future. The day of the old aerodrome performance is past and there is no good reason why cross-country races, started and finished at a given point, should not prove successful from a financial standpoint as well as giving free entertainment to the great masses of people who would not go out to the aerodrome anyway. Furthermore, such exhibitions may possibly whet the appetite of a great many of the non-paying spectators and create a desire within them to witness the start and the finish of some succeeding race. You must first interest the people if you expect their patronage.

There was a tremendous crowd at the Aeronautical Society's grounds at Oakwood Heights to witness the start and the finish of the race, so that the fact of giving a free exhibition to the millions of people of New York City and its vicinity did not detract from the aerodrome gathering anyway; in fact, if anything, it helped to increase the crowd, owing to the enormous publicity the affair received.

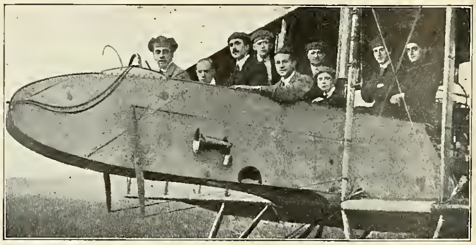
There is no good reason why the success met with by the Aeronautical Society in giving its first Aerial Derby around the City of New York and covering a distance of approximately 60 miles, cannot be duplicated in every other big city in the United States, and if the Aero Clubs in the different cities of this country will only work up the matter thoroughly during the winter, each big city should see at least three or four of these aerial derbies during next summer. The different organizations, however, should work in conjunction with one another so that the aerial derbies will not conflict in dates any more than possible and that they may be able to secure not only five skillful pilots to enter their races, but 20 or 30 of the best aviators in this country.

These races, however, should be arranged so that they point out some useful lesson and not merely thrill the people temporarily. The utility of the machine should be brought into play as much as possible. In races around cities such as New York, which is entirely surrounded by water, the air boat would probably prove more useful to educate the people and attract converts to the cause than the overland machine, while in cities which are not surrounded by water, of course the overland machine would prevail. Overland machines should not be utilized for overwater racing any more than the overwater machine should be used for overland racing.

The race around New York with overland machines, while spectacular and interesting and witnessed by millions of people, probably did not attract one new convert to the movement, and after all, unless people can be brought into the movement who will purchase machines, there can be no progress made. The industry cannot depend upon exhibition flyers for its sustenance, for as soon as the exhibition business plays out the movement would naturally die. What we need in the movement are men who can afford to buy machines, and people are not going to buy these machines unless they can make use of them.

We believe, therefore, that if a good race could be held around the City of New York with flying boats and that these boats were made to fly close to the water part of the way and run upon the water part of the way, that the handling of them would appear so simple and easy that there would be hundreds of men witnessing the race who would feel that they could do the same thing. Owners of motor boats and yachtsmen and even automobilists with sufficient money to purchase flying boats would be made to feel that the art of flying was not such a difficult and dangerous thing after all, and consequently many purchasers of flying machines would result from such a sensible demonstration.

The manufacturers and aeronautical organizations must use good judgment in the future and adopt only such methods of demonstrating flying machines that will inspire public confidence and create a desire among the people to take up flying.



Grahame-White seated at the wheel of his new record-breaking aero-bus which has risen 600 feet with ten people aboard.

Foreign News

BY

Arthur V. Prescott

Belgium

CROMBEZ JOINS BELGIAN ARMY.

Crombez, the noted Belgian pilot, who conducted a very successful aerial post service at the Ghent exhibition and who more recently finished fourth in the Gordon Bennett Aviation Race, has accepted an offer from the Belgian government and has been appointed to the flying corp stationed at Brasschaet.

Holland

HOLLAND STRENGTHENING HER AERIAL FORCES.

After a protracted enquiry as to the state of military aviation the Dutch government recently ordered from the Farman Brothers an escadrille of biplanes. Three of these machines were tested at Buc on September 16, by Bille, in the presence of a deputation of Dutch military officers, and with a load of 270 kilogs. they climbed 500 metres in about five minutes.

England

HAMEL WINS AERIAL DERBY RACE AROUND LONDON.

The second aerial derby race around London held on September 20, was one of the most imposing air spectacles ever seen in England. The race which started and finished at the Grahame-White aerodrome, was probably witnessed by two million people, while sixty thousand paid to enter the grounds. Before and after the race, which started at 4 P. M., wonderful exhibition flying was indulged in by a number of the aviators present. Mr. George W. Beatty, the American aviator, performed in his usual masterly fashion and his "wrigglesome" Wright, as the English term his machine, was performing its usual gyrations over the field and carrying numerous passengers. Mr. Claude Grahame-White flew on his Maurice Farman. Mr. Gooden made a fine flight to an altitude of 3,000 feet in a 35 H. P. Anzani Caudron biplane, while Messrs. Manton, Carr, Birchenough, Pickles, Verrier and others, carried passengers and performed stunts throughout the afternoon.

Mr. Noel took up the big five-seater Grahame-White aerobus which recently made a record by carrying seven passengers for 17 mins., this time with five passengers aboard. He rose to a considerable height above the aerodrome, when it was observed that two of the passengers, apparently tiring of staying in the nacelle, were observed to climb out, one along each side of the planes until they had reached the extreme tips of the wings where they sat down as the accompanying photograph shows, and horrified the crowd by dangling their legs and cutting up in various other ways.

THE RACE.

The competitive machines were sent off accurately at intervals of one minute, in the following order:

1. Caudron biplane (60 Anzani), pilot, M. E. Baumann.
2. Henri Farman biplane (80 Gnome), pilot, M. P. Verrier.
3. Blériot mono (80 Gnome), pilot, Mr. W. L. Brock.
4. Blériot mono (80 Gnome), pilot, Mr. B. C. Hucks.
5. Avro biplane (80 Gnome), pilot, Mr. F. P. Raynham.
6. Sopwith biplane (80 Gnome), pilot, Mr. H. G. Hawker.
7. Morane-Saulnier mono (50 Le Rhone), pilot, M. P. Marty.
8. Morane-Saulnier mono (80 Le Rhone), pilot, Mr. R. Slack.
9. Martinsyde mono (120 Austro-Daimler), pilot, Mr. H. Barnwell.
10. Deperdussin mono (100 Anzani), Lt. J. C. Porte, R. N.
11. Morane-Saulnier mono (80 Gnome), pilot, Mr. G. Hamel.

The machines took off in a northwesterly direction, passing pylon No. 1 on their left, and then turned to their correct course (S.S.W.). It speaks well for the state of nerves of all concerned that not a single bad start was made; the most spectacular was that of Mr. Hawker, who turned sharp and close to the pylon while still rising, a sight which—together with the pilot's fame—drew him a hearty cheer as he passed above the enclosure. Mr. Hamel's departure, the very reverse of Mr. Hawker's, seemed to thrill the crowd exceedingly; his short, flat racing wings forced him to start from a point far in rear of the other machines, he must have been speeding over the ground at fully 60 m. p. h. before he showed any tendency to lift, and even then his rising was so gradual that he could not attempt to turn for several hundred yards.

When the machines were well out of hearing, the ever discreet megaphone man confided to his audience the details of the sealed handicap for the three prizes, £100, £75, and £25 presented by the distributors of "Shell" motor spirit. This handicap, of course, had no bearing upon the result of the "Derby" proper, though flown concurrently with it, the "Derby" prize (a gold cup and £200 presented by the "Daily Mail") going to the machine which completed the course in the shortest time.

The "Shell" handicap allowances were as follows:

Mr. Hamel, scratch.
Mr. Slack, 5 mins. 4 secs.
Lieut. Porte, 6 mins. 39 secs.
Mr. Barnwell, 6 mins. 39 secs.
M. Marty, 10 mins. 46 secs.
Mr. Raynham, 11 mins, 43 secs.
Mr. Hawker, 12 mins. 10 secs.
Mr. Hucks, 19 mins.
Mr. Brock, 19 mins. 57 secs.
M. Verrier, 29 mins. 8 secs.
M. Baumann, 56 mins. 42 secs.

Announcements were made from time to time as news trickled in from the various controls, while exhibition and passenger-flying kept the spectators interested. At quarter past five it was announced that within ten minutes the leading machines should be in sight, and there passed through the vast concourse a vocalized ripple of excitement which swelled in volume as two monoplanes were seen away to the northeast, and when, a few minutes later, Mr. Hamel's machine drove over the aerodrome with the speed of a projectile, closely pursued by Mr. Barnwell's thundering Martinsyde, a roar arose which, from a distance, resembled nothing so much as the sound of a thousand disturbed beehives. At short intervals the remaining machines arrived, with two exceptions, for M. Baumann had come down with a troubled engine near Epsom, and Lieut. Porte at Copthall near Epping, neither suffering any personal damage.

The result of the "Derby" was as follows:

1. Mr. Hamel (Morane), time, 1 hr. 15 mins. 49 secs. Average speed, 75.18 m.p.h.
2. Mr. Barnwell (Martinsyde), time, 1 hr, 18 mins. 44 secs. Average speed, 72.39 m.p.h.
3. Mr. Hawker (Sopwith), time 1 hr. 25 mins. 24 secs. Average speed, 66.74 m.p.h.
4. Mr. Raynham (Avro), time, 1 hr. 26 mins. 1 sec. Average speed, 66.26 m.p.h.
5. Mr. Slack (Morane), time, 1 hr. 29 mins. 59 secs. Average speed, 63.24 m.p.h.
6. Mr. Hucks (Blériot), time, 1 hr. 30 mins. 53 3-5 secs. Average speed, 62.72 m.p.h.
7. Mr. Brock (Blériot), time, 1 hr. 32 mins. 29 1-5 secs. Average speed, 61.63 m.p.h.
8. M. Marty (Morane). time, 1 hr. 35 mins. 51 2-5 secs. Average speed, 59-47 m.p.h.
9. M. Verrier (H. Farman), time, 1 hr. 45 mins. 7 secs. Average speed, 54.22 m.p.h.

The "Shell" Handicap result was as follows:

1. Mr. Hucks, time, 1 hr. 11 mins. 53 3-5 secs.
2. Mr. Barnwell, time, 1 hr. 12 mins. 5 secs.
3. Mr. Brock, time, 1 hr. 12 mins. 32 secs.
4. Mr. Hawker, time, 1 hr. 13 mins. 14 secs.
5. Mr. Raynham, time, 1 hr. 14 mins. 18 secs.
6. Mr. Hamel, time, 1 hr. 15 mins. 49 1-5 sec.
7. M. Verrier, time, 1 hr. 15 mins. 59 secs.
8. Mr. Slack, time, 1 hr. 24 mins. 55 secs.
9. M. Marty, time, 1 hr. 25 mins. 5 2-5 secs.

GRAHAME-WHITE BUS MAKES WORLD'S RECORD WITH NINE PASSENGERS.

The aeroplane passenger record was broken at Hendon on October 3rd when Aviator Noel took up nine passengers to a height of 600 feet and remained in the air for twenty minutes.

PEGOUD ASTONISHES BRITISHERS.

On September 25, 26 and 27, at the Brooklands aerodrome, Pegoud gave Britishers an exhibition of his marvelous flying. In addition to flying upside down he upset his machine sideways, stalled it and slid backwards as well as accomplishing a number of loop the loops. It is stated that he succeeded in looping the loop several times successively during one descent.

MR. PEMBERTON BILLING EARNS HIS LICENSE IN ONE DAY BEFORE BREAKFAST.

As a result of a sporting bet between Mr. Handley-Page and Mr. Pemberton Billing of $25,000, as to which of them would pass the test for aviator's certificate in the quickest time, neither of them having previously flown, Mr. Billing succeeded in winning it and at the same time setting up a record for winning a license in the shortest time.

Starting his tuition just before six o'clock in the morning on an old Farman biplane under the instruction of Mr. Barnwell, who to accelerate matters got into the passenger seat and allowed the pupil to take control from the start. The machine was taken straight off the ground without any preliminary runs and the pupil made to control it as best he could, the pilot only taking a hand when things seemed dangerous. In this manner after a flight of twenty minutes, Mr. Billing was ready to fly alone and inside of three hours he had succeeded in passing his tests and was flying for the cinematograph. Mr. Page, not having succeeded in getting his license by noon, was forced to acknowledge himself beaten.

HERR FRIEDERICH ON HIS ETRICH FLIES TO LONDON.

Following on his flight from Berlin to Paris, Herr Friederich accompanied Igo Etrich on the Etrich Taube on September 13, from Paris to London. After giving several exhibitions at Hendon for a few days he left again accompanied by Etrich and flew back to Berlin where they arrived on Sept. 20th.

France

PREVOST ON DEPERDUSSIN WINS.

International Aviation Cup Flying at a Rate of 125 Miles an Hour.

The Gordon Bennett International Aviation Race, held at Rheims, on Sept. 29, resulted in a victory for France. Maurice Prevost, flying a 160 H. P. Deperdussin monoplane, captured the cup by covering the distance of 124.27 miles in the wonderful time of 59 mins. 49 secs., or at an average speed of 125 miles an hour or more than two miles a minute.

Emile Vedrines and Gilbert, two other Frenchmen, finished second and third respectively. The former flew a 160 H. P. Ponnier-Pagny (Hanriot) and covered the distance in 60 mins. 51 2-5 secs., while the latter, who flew a 160 H. P. Deperdussin, completed the course in 62 mins. 55 2-5 secs. The only other contestant, Albert Crombez, a Belgian, also on a Deperdussin, took 69 mins, 52 secs. to complete the course.

Prevost's greatest burst of speed was when he made a 6.213 mile circuit of the aerodrome in 2 mins. 56 3-5 secs., or at the extraordinary rate of 2 1-10 miles a minute. Prevost's machine was a Deperdussin similar to the one Jules Vedrines flew at Chicago last year but fitted with a 14-cylinder Gnome of 160 H. P. The wing surface had been cut down to a little more than 90 square feet, and had there been much wind, he would have been forced to use slightly larger wings to complete the turns safely, in which case his speed would have been slightly diminished.

Owing to an unfortunate misunderstanding both Harold Kantner and Charles T. Weymann, the American representatives at the race, were unable to procure machines.

Although the International Speed contest was the main feature of the Rheims meet, it was not the chief attraction from the spectators' point of view for they were more interested in the acrobatic stunts that Garros, Des Moulinais, Jules Vedrines and others performed and also in the preliminary contest for standard machines, on September 28th. A special feature was a slow speed race for fast machines over a course of 30 kilometres (18.6 miles) which was won by Des Moulinais on a Morane-Saulnier in 24 mins. 57 secs. Moineau on a Breguet was second.

The finest spectacle of the meet was the start of the cross country race of 150 kilometres (93.1 miles) or five times a circuit from Rheims to Vitry to Brienne and back to Rheims.

The machines started all in a line at the same instant. First, seven biplanes left together, then seven monoplanes.

Probably nothing more spectacular and certainly nothing more beautiful was ever seen in the sport of aviation.

LIKE CLOUD OF WASPS.

At the starter's signal the aeroplanes flew off exactly like a cloud of giant wasps, obscuring the near horizon.

The spectators, thrilled, watched excitedly for the return of the machines after each circuit.

The winner was Mr. Rost, on a Deperdussin, in the monoplane class, and Mr. René Caudron, on a Caudron, in the biplane class.

Mr. Rost's time was 1 hr. 6 mins. 18 1-5 secs. Mr. Caudron's time was 1 hr. 35 mins. 51 secs.

During the race three of the biplanes abandoned the contest and most of the others were compelled to land once or twice.

Several aviators continued the altitude competition. Eugéne Gilbert, on a Morane-Saulnier monoplane, with an 80-horse power Rhone motor, made a brave effort to beat the world's record of 5,810 metres (about 19,000 feet). He took a supply of oxygen, but an official examination of his recording instruments showed he had reached only 5,785 metres (about 18,800 feet). Mr. Parmelin, on a Deperdussin, rose 4,276 metres (about 13,900 feet). Mr. Legagneux, on a Morane-Saulnier monoplane, reached 2,583 metres (about 8,400 feet). Mr. Deromme, on a Bréguet biplane, with two passengers, reached 2,298 metres (about 7,500 feet).

FLIES UPSIDE DOWN ON CAUDRON BIPLANE.

That Pegoud's feat of flying upside down can be accomplished on almost any good aeroplane has been recently proven by one or two aviators who, on different makes of machines have successfully emulated this performance, and this only goes to show that such flying does not especially demonstrate that the Blériot machine is superior to other machines in this respect.

On September 20 and 21, Chanteloup, on an 80 H. P. Caudron biplane, flew his machine upside down and made corkscrew twists, similar to Pegoud's, at the Douai aerodrome.

HENRY FARMAN HAS A MISHAP.

Those who have followed aviation from its early days and noted the consistent flying of Mr. Henry Farman on his own machines of various designs, were somewhat shocked to learn that he recently sustained a mishap while flying one of his new biplanes accompanied by Mlle. Darcy. It appears that following the example of his wonderful trick pilot, Chevillard, he was endeavouring to make a steep spiral, and heretofore being a safe and sane flyer he was not accustomed to these foolhardy corkscrew descents and consequently misjudged his landing and smashed the machine, fortunately but slightly injuring himself and his passenger.

SEGUIN FLIES BACK FROM BERLIN.

After his recent splendid non-stop flight from Paris to Berlin, Seguin started to fly back on his Farman on September 15. Owing to the gusty wind he was, however, brought down at Gottingen and had to stay over night. On restarting the next morning he got on to Coblentz where another stop was necessary and it was not till September 21 that the weather permitted him to fly through to Rheims.

FLIES 600 KILOMS. TO MANEUVERS.

Receiving orders to join escadrille No. 5, at the maneuvers, Lieut. Collard recently flew from Epanile to Agen, his destination, a distance of 600 kiloms. He encountered very rough weather, especially in the neighborhood of Bordeaux, but accomplished the trip without a hitch.

PAUL FAUCHILLE.

Paul Fauchille is the original exponent of reasonable legal regulation of aeronautics. In 1901 he published a complete study of the subject in *La Revue générale de droit international public*, of which he was the founder. The following year, through his enthusiasm, the Institute of International Law studied the subject, with him as reporter, and he held the same position when the Institute prepared the way for regulation of wireless telegraphy in 1906 and returned to aeronautics in 1910 and 1911. He was born in 1858 and is

Paul Fauchille.

perhaps France's most diligent writer on international legal affairs. He was a member and the reporter of the French Inter-ministerial Commission on Aerial Navigation in 1909, delegate to the International Conference on Aerial Navagation in 1910, one of the founders and members of the Directing Committee of the International Juridic Committee on Aviation. His work in aeronautics has been notable because of his persistency in upholding the doctrine of the freedom of aerial circulation.

GUILLAUX NOW LEADS FOR POMMERY CUP.

It now appears that Guillaux is the leader in the Pommery Cup Contest. The French Aerial League has received from the Army Geographical department a report on the distances flown by Des Moulinais and Guillaux in the Pommery Flight Contest. For his flight from Biarritz to Brackel, Guillaux is credited with 1,386 kiloms., while the distance of Des Moulinais' trip from Villacoublay to Warsaw is given as 1,382 kiloms., thus Guillaux leads by four kiloms.

U. S. BALLOONS FIRST AND SECOND IN GORDON BENNETT BALLOON RACE.

The International Balloon Race in which 18 balloons started on October 12th from the Tuileries Gardens, Paris, was won by the American balloon "Goodyear," piloted by Ralph Upson and his aide, R. A. Preston. The "Goodyear" landed at Bridlington, England, on October 14th, having covered a distance of 400 miles.

The "Uncle Sam," the other American balloon in the contest, which was piloted by H. E. Honeywell and J. H. Wade, finished second, landing at Pont de Buis, France, on October 14th, and covering a distance of 300 miles.

Third place was secured by the Swiss balloon "Helvetia," piloted by Mr. Armbruster and his aide, Mr. Seiffert, which landed at Bolazec, France, after covering a distance of 270 miles.

There was very little wind blowing throughout the contest and since what little there was blew toward the sea, this accounts for the short distances covered by the balloons.

The order of starting and those who took part in the contest are as follows:

1. France, the Picardie, Mr. Maurice Bienaimé and Mr. Schneider.
2. Great Britain, the Banshee, Mr. John Dunville and Mr. Corbett.
3. Italy, the B. A., Signor Agostini and Signor Valle.
4. Belgium, the Patrie, Mr. Léon Gérard and Mr. Jan Nuffel.
5. Austria, the Astarte, Herr Sigmundt and Herr Macher.
6. Germany, the Duisburg, Herr Kaulen and Herr Schmitz.
7. Switzerland, the Zurich, Mr. Victor De Beauclair and Mr. Gerber.
8. France, the Ile de France, Mr. Alfred Leblanc and Mr. Duhonnet.
9. England, the Honeymoon, Mr. J. de Francia and Mr. Jourdan.
10. Italy, the Roma, Signor Pastine and Signor Tullio.
11. United States, the Uncle Sam, Captain H. E. Honeywell and Mr. Wade.
12. Belgium, the Belgica II., Mr. E. de Muyter and Mr. W. Leminck.
13. Austria, the Frankfurt, Herr Lehnert and Herr Kusch.
14. Germany, the Hamburg II., Lieutenant von Pohl and Herr Perlewitz.
15. Switzerland, the Helvetia, Mr. Armbruster and Mr. Seiffert.
16. France, the Stella, Mr. René Rumpelmayer and Mme. Goldschmidt.
17. United States, the Goodyear, Mr. Ralph Upson and Mr. Preston.
18. Germany, the Metzler, Herr H. Berliner and Herr Mann.

FLIES 100 MILES IN 55 MINUTES.

On September 22 Aviator Gilbert flew from Paris to Rheims, a distance of 100 miles, in 55 minutes. He arrived at Rheims before the news of his departure could be telephoned from Paris, as will be easily believed by those acquainted with the French telephone service.

GARROS FLIES ACROSS THE MEDITERRANEAN.

On September 23, Roland G. Garros on a Morane-Saulnier monoplane flew across the Mediterranean from St. Raphael, France, to Bizerta, Tunis, in 7 hrs. 53 mins. a distance of 600 miles. This flight, which was made without a stop, is one of the most remarkable demonstrations of the perfection with which aeroplanes and motors have already attained and shows that we are nearing the time when it will be possible to cross the Atlantic in an aeroplane.

During recent flights of the new Grahame-White record breaking aerobus two or three of the passengers left the nacelle and climbed along the planes to different positions. Our picture shows how, on one of these occasions, two of the passengers climbed out, one to each end of the huge planes where they sat dangling their feet and shifting around in a manner greatly horrifying to the spectators below. The only value that can be attached to this foolhardy performance is that it proves the great stability which such large machines possess, and demonstrates that in the future when large aeroplanes are built mechanics will be able to clamber around and make adjustments while in flight and look after and regulate the several motors in the same way that they now do on the big Zeppelin airships.

PARIS TO CAIRO FLIGHT PROJECTED.

National Aerial League Arranges 3,000 Mile Tour To Be Attempted This Month.

The National Aerial League of France has organized two great aeroplane tours. The first will be from Paris to Cairo, Egypt, and the second from Paris to the Persian Gulf.

The estimated three thousand mile trip between Paris and Cairo will be attempted at the end of this month. The route will be by way of Vienna, Belgrade, Constantinople, Konieh, Aleppo, Jerusalem, Port Said and Heliopolis. Elaborate arrangements will be made through the French Foreign Office with the French consuls in the various countries to be passed through to facilitate the tasks of the aviators.

Large supplies of gasolene and lubricating oil have been shipped to Constantinople, whence they will be distributed to the control stations at points in the Orient, which will be placed about two hundred miles apart.

MOREAU SELF-RIGHTING MONOPLANE WINS BONNET SAFETY PRIZE.

On September 24th the French aviator Moreau, piloting his self-righting monoplane, won the Bonnet prize offered for the best aviation safety device.

Accompanied by Lieut. Lafon as official observer, he flew for half an hour without touching the levers. A strong wind was blowing and the monoplane rolled and pitched but never failed to right to a level keel. It appears that the rudder was used quite extensively for aiding lateral balance, so that this performance is not a true test of stability.

The Moreau monoplane is balanced by the swinging of the seats pendulum fashion; provision is made to damp out excessive oscillation and to lock the seats if desired so that in landing or starting the machine can be controlled like an ordinary aeroplane.

FRANCE OPENS AERIAL MAIL ROUTE.

It is announced from Paris that a regular aerial mail service has been established between Villacoublay and St. Julien, France, a distance of 250 miles, and that on October 15th, Lieut. Rodin carried postal matter from the former to the latter point, where an automobile met him and took the mail to Bordeaux, where it was shipped to the West Indies. It is stated that an aerial mail route can be developed so as to save two weeks in replying to West Indian correspondence. Another like experiment is to be made between Paris and some Mediterranean port.

PIONEER IN DEVELOPMENT OF DIRIGIBLES MADE COMMANDER OF LEGION OF HONOR.

The French Aero Club on Oct. 20 unveiled a monument to Mr. Alberto Santos-Dumont at Saint Cloud to commemorate his pioneer achievements in aeronautics.

Mr. Léon Barthou, a brother of the Premier, praised Mr. Santos-Dumont and reminded his hearers that twelve years ago Mr. Santos-Dumont doubled the Eiffel Tower in a dirigible.

Mr. Barthou in behalf of the government made the distinguished aeronaut a Commander of the Legion of Honor.

Mr. Santos-Dumont, who is a Brazilian by birth, said that the realization of his early dreams are largely due to the sympathy and encouragement he found in the French atmosphere.

Germany

STOEFFLER FLIES 1,376 MILES IN 24 HOURS.

In competition for the chief prize of the National aviation subscription, to be awarded for the longest European flight of the season, Victor Stoeffler in a 100 H. P. biplane, started from the Johannisthal aerodrome soon after midnight, Tuesday, October 14th, and landed at Mulhausen eighteen minutes to one o'clock Wednesday morning, having covered 1,376 miles. His actual flying time was 22 hours 47 minutes, in which he accomplished a trip from Johannisthal to Posen and return; then from Johannisthal to Mulhausen and to and from Mulhausen and Darmstadt, making no less than four trips between the two latter cities.

On October 15th, Robert Thelen, carrying a passenger, covered a distance of 867 miles, on an Albatross biplane.

During this flight, Thelen touched at Koenigsberg, Stettin and Danzig and returned to Koenigsberg.

Italy

NEW ITALIAN ONE-PASSENGER HEIGHT RECORD.

Flying at the Mirafiori aerodrome near Tunis, Sergeant Major Petazzi recently beat the Italian passenger height record by ascending 2,200 metres in his 80 H. P. Farman, accompanied by Engineer Pomilia.

Russia

On September 20, Lieut. Poplavko left Moscow for St. Petersburg. After flying for three and a half hours he landed at Sver and after a rest continued and got to Vichnii-Volotchek where he was held up owing to the weather.

The Russian Military Competition was won by Janoir on a Deperdussin two-seater (80-h. p. Gnome), which, in spite of being handicapped by additional marks allowed to machines of Russian manufacture, beat all competitors in speed, quick-starting, height and duration. Its climbing speed was 500 metres (1,650 feet) in 3 mins. 45 secs. Towards the end of the competition an extraordinary accident happened, when the Russian aviator Vlynsky was testing a machine built in Moscow to the design of a German named Meller. Just when the machine was flying over the Sikorsky "Grand" the motor apparently fell out of it bodily and fell on top of the Sikorsky, smashing the planes and one of the motors of the big machine. The pilot of the Meller, in spite of the alteration in weights, managed to keep his machine under control, and landed from a height of 150 feet. It will probably take a considerable time to repair the Sikorsky, as there is such a lot of it, but it is scarcely fair to argue that if the machine had been smaller it would not have been hit, and to use it as an argument in favor of wings like those on the racing Morane.

Spain

GOOD FLYING AT WATER-PLANE MEET.

At the recent San Sebastian hydro-aeroplane meet some good flying was accomplished by Renaux on a Maurice Farman, Carterey and Audemars on Moranes and Chemet and Divetain on Borels.

Sweden

CHEVILLARD IN SWEDEN.

Following his flight from Copenhagen to Gottenberg, Chevillard has been continuing his good work in Sweden and recently made a cross country flight from Halmstadt to Jonkoping and then on to Malmstatt. Later he continued on to Stockholm.

Boland and Holland Patents Conflict

It is a surprising fact that patent examiners, builders, patent attorneys, magazine editors and others have only recently discovered the patent issued to Leicester B. Holland for a control which seems identical with the Boland control, which is alleged not to infringe the Wright patent and on which application for patent was made on March 18, 1910, just a few days prior to the application, on March 21, 1910, for the Holland patent, which actually issued on Sept. 19, 1911, No. 1,003,459.

The patent examiner in each case has apparently not been cognizant of the work of his colleagues until very lately, when interference proceedings have been instituted. The Holland patent has long been issued and the inventor naturally supposed himself safe as to priority. Boland has priority of application and Holland has the issued patent. Boland has gone along building machines and prosecuting the claims on his unissued patent under the same belief, totally unaware of the existence of a patent already issued covering the identical feature—at least it seems so, for did they not conflict there would be no interference action.

There are eight claims to the Holland patent which cover, in short, a rigid vertical surface at each lateral extremity of an aeroplane means for swinging each of these vertical surfaces about a diagonal axis extending from one edge of one main plane to a point in vertical alinement with the opposite edge of the other main plane.

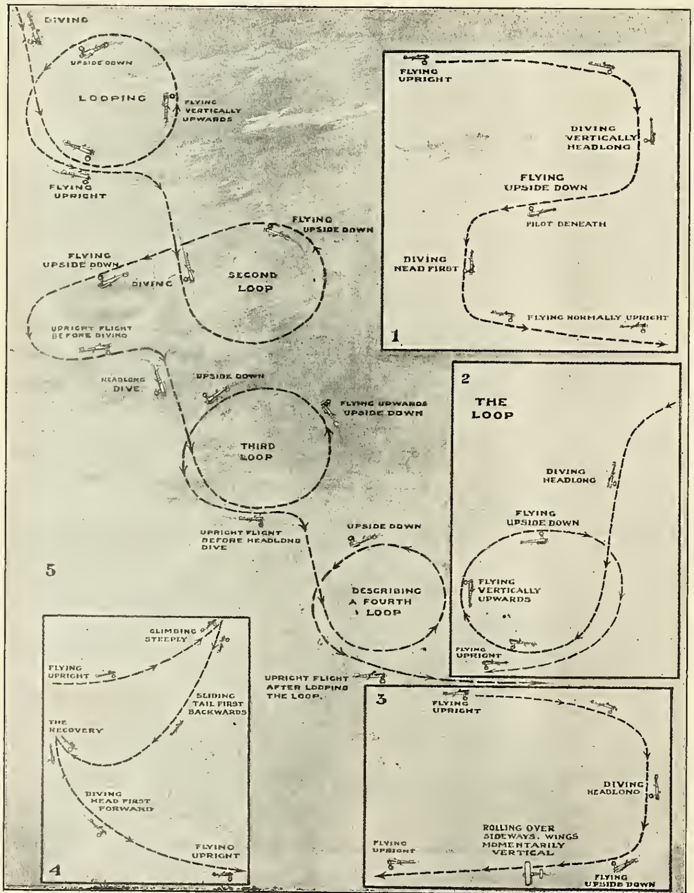


Diagram showing Pegoud's remarkable evolutions in the air. Fig. 1 shows Pegoud executing a figure "S." Fig. 2 shows him making a single "loop the loop." Fig. 3 shows Pegoud's headlong dive and upside down flight and the manner in which he rights himself, in this instance by rolling over sideways. Fig. 4 shows how he tail slides and recovers. Fig. 5 shows a remarkable descent by Pegoud in which he loops the loop four times and performs other wonderful evolutions. It is reported that Pegoud has lately successfully accomplished descents during which he has looped the loop eight or ten times.

A DESIGN FOR A TAIL-FIRST MONOPLANE

By LOUIS D. NADEL

The practical results, obtained by the Voisin Brothers, Boland, Reissner, Besson, Blériot, and others, having proved the feasibility of the tail-first type of aeroplane, it is surprising to the writer that no more of our standard aircraft manufacturers have taken up the construction of this class of aeroplane, if not on a commercial, at least on an experimental scale, especially in view of its inherent advantages and extraordinary efficiency. Many may be skeptical concerning the superiority of the tail-first or "Canard" plane to the types at present common but it is hoped that the facts given below, will dispel the last vestiges of doubt.

The elevating rudders of the original Wright aeroplane were placed in front of the main planes, for in this position their action in changing the course of the machine was most direct. They did not prove very successful because they included no fixed surface to aid in the retention of longitudinal stability. It is obvious, however, that the system of raising the head of the machine when it is desired to rise, and lowering it when it is desired to descend, is infinitely more direct, practical, and efficient than the rather roundabout method of lowering the rear of the aeroplane to ascend and raising it to descend. By placing the forward plane at a greater angle of incidence than the main plane, we obtain a dihedral angle open at the bottom, which gives splendid longitudinal stability.

The position of the aviator and his passengers out in front of the main plane on a tail-first aeroplane gives a practically unimpeded view on all sides. By judicious designing the motor can be placed so far to the rear and the aviator, in order to counter-balance it, so far to the front with a good length of fuselage before him and between him and the motor, that in the event of a bad fall, it will be impossible for him to be crushed by the impact or as a result of the motor falling on top of him. Especially in military machines will this combination of excellent range of view and large factor of safety be appreciated.

Another advantage of a "Canard" is its ability to fly with less power than other types, especially tractors. Sir Hiram Maxim has proved that a propeller operating in the rear of an aeroplane is more efficient than one operating in the front, for the former turns in air that, owing to the resistance of the aeroplane, already has a forward motion. Also there are no parts of the machine in the slip-stream of the propeller to offer increased resistance or to be in danger of injury in the event of the propeller breaking. The direct type of longitudinal control of course permits of leaving the ground with less power and at lower speed.

In summarizing the advantages of the tail-first type of aeroplane, the writer desires to call particular attention to a quotation from the February, 1913, number of AIRCRAFT concerning the performance of the Blériot Canard.

"The tests proved very successful in every way, the machine flying and handling better than the regular tractor type."

The "Canard" has suffered in comparison with other types on account of its rather elementary design. The writer has attempted to offer a solution for the problems of tail-first aeroplane construction in the accompanying design.

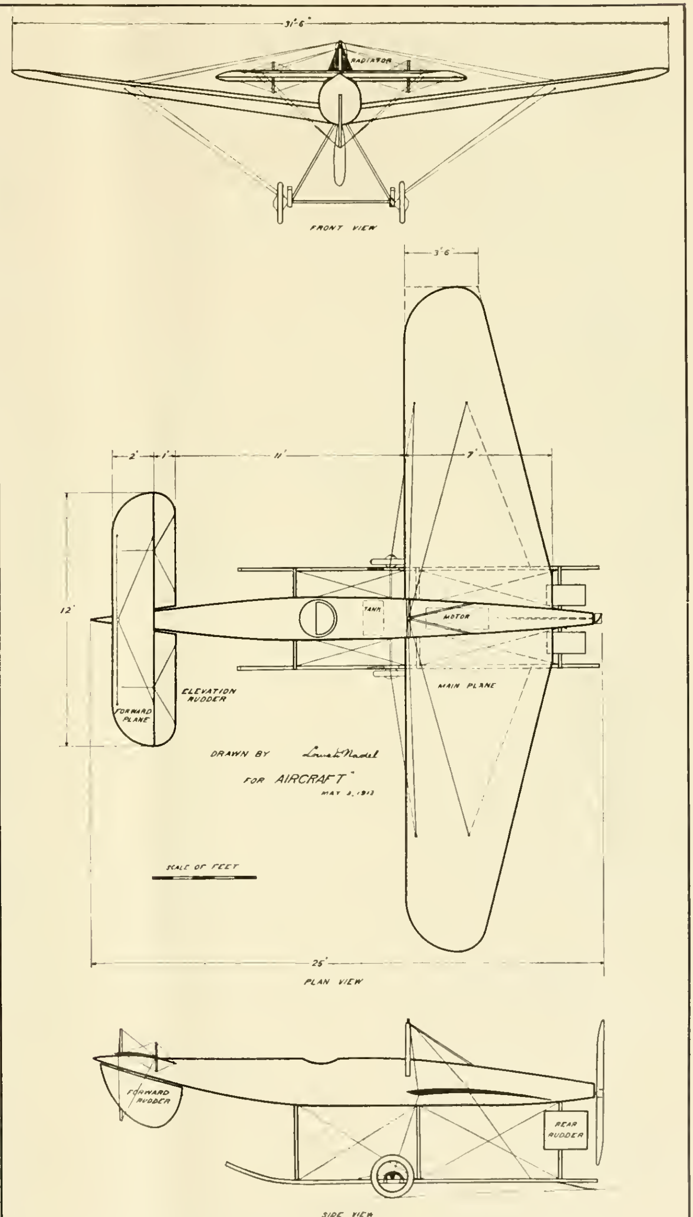
General Description.

The drawings illustrate a one-passenger monoplane of the tail-first type in which the writer has endeavored to incorporate maximum efficiency as well as beauty of design.

The principal dimensions of the machine are as follows: Length, 25 feet; span, 31 feet, 6 inches; effective supporting surface, 175 square feet, about one-sixth of which is in the forward plane. The aeroplane should weigh 650 to 700 pounds complete, minus aviator and fuel. A conservative calculation places the lift at six pounds per square foot. This gives a total lift of about 1,000 pounds. Giving the weight of the aviator as 150 pounds, we have sufficient fuel-carrying capacity with a 40-50 H. P. motor for a continuous flight of several hours.

Main Planes.

The span of the main planes is 31½ feet. The chord varies from 7 feet at the widest part to 3½ feet at the narrowest. They attach to the bottom of the fuselage at a pronounced dihedral angle. This, with the high center of gravity gives almost complete inherent stability. Though the planes are rather narrow at the extreme outside edges, the wider span across the rear gives sufficient surface for great lateral control; at the same time a single set of guy wires, of course in duplicate, is amply sufficient to brace the planes.



Louis Nadel's Suggested Design for a Tail-first Monoplane

Forward Plane.

This plane is 2 by 12 feet and is braced by one set of guy wires leading to the upper and lower extremities of the rudder-post. At its rear edge are hinged two elevation rudders of 11 square feet area.

Fuselage.

The fuselage is 24 by 2 feet and is constructed of heavily reinforced fibre. Without detracting from its strength or compactness, it has the most excent of stream-like forms. At the front is attached the forward plane at an angle of incidence of 7 degrees, while toward the rear are attached the main planes at an angle of incidence of 4½ degrees. The position of the aviator, fuel-tank, and motor may be determined by a glance at the accompanying drawing. The propeller is driven through a shaft supported at intervals by annular ball bearings.

Rudders.

The front rudder is immediately beneath the forward plane. The two in the rear are pivoted on the rear uprights of the landing chassis. The front and rear rudders act inversely.

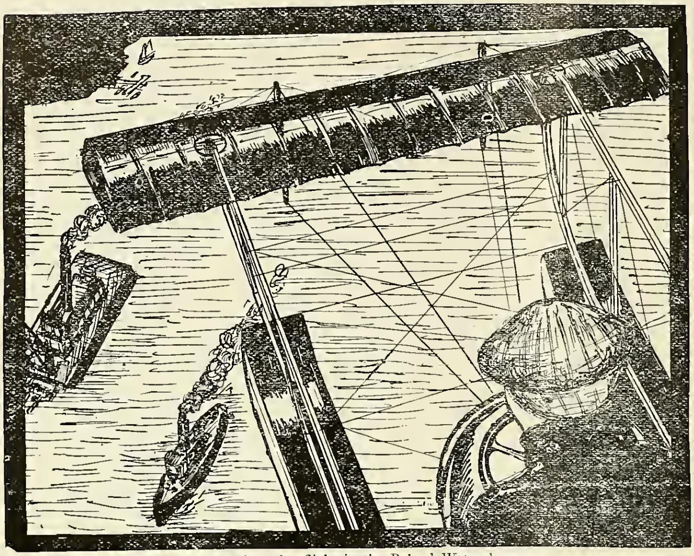
Miscellaneous.

A motor of 30-50 H. P. is advised; the speed ranging from 55 to 75 miles per hour.

A Flight in the Boland Tailless Rudderless Waterplane

With Some Observations on the Actions of the Novel Boland Control and Water Flying in General

By WALTER H. PHIPPS



Impression of a flight in the Boland Waterplane.

Mr. Horace Kemmerle, being desirous of demonstrating to me the flying qualities of the Boland machines and the ease and safety of their simple control, recently extended me an invitation to accompany him on a flight in the new Boland water-plane over Newark Bay.

Accordingly, at the first opportunity, I set out for Newark on the morning of September 27th, arriving at the company's works about eleven o'clock, only to find that Mr. Kemmerle and Mr. Joe Boland had already left in a launch for the hangar as they had to make some adjustments on the machine and fit a new propeller.

The particular spot on Newark Bay where the Boland hangar is located is not the easiest place in the world to reach by water, but when one has to make the trip in a roundabout fashion, via trolley, a buggy, and a rowboat, the prospect, to say the least, is not very inviting.

However, fortified by the knowledge gained through several years' experience in reaching some of our so-called accessible aerodromes and armed with enthusiasm and the by-no-means small amount of directions given me at the factory, I set out determined to reach that illusive hangar or know the reason why.

After a tedious ride by trolley and a two mile trip across meadows, I at last came to Frey's dock, where I had been told I could get a rowboat and would be given instructions how to reach the hangar.

Accordingly, having procured the boat and being informed that the hangar was situated near shore about a half a mile distant, I set out in its direction and soon located it some distance down the Bay. However a dredge, which I afterwards had good cause to remember, had taken up its position several hundred feet in front of the hangar and run its pipes to the shore, thus effectually blocking my progress and causing me to make a wide detour out into the Bay and around it.

As the wind was blowing about 25 miles an hour straight at the dredge, I found it no easy task making headway and I began to wonder how a hydro-aeroplane could ever be steered around it in the limited space available.

But all things come to an end and I drew up at last tired but enthusiastic in front of the shed and was welcomed by Messrs. Joe Boland, Kemmerle, Hoefflich, Strom and others of the staff, who in wonder had come to the door of the hangar to see who the pilot of the two-oared hydro could be.

I was soon inside the hangar inspecting the machine, which looked very business like and substantial, with its long twin floats and ample sized skids and struts. The thing that impressed me most, however, was the feeling of confidence the machine inspired, for, looking at it standing in its hangar with its floats extending nearly its whole length, it seemed impossible to tip over in alighting or running on the water and made one long to take it out and go skimming around the bay. Another thing I noticed with a certain amount of gratification was the fact that the main planes had been sloped back a bit as I have repeatedly advocated in Aircraft, and in a discussion with Mr. Boland I was informed that this arrangement had greatly improved the machine's stability and flying qualities.

After Mr. Boland, who by the way is responsible for the Boland motors and the man actively in charge of the development of the Boland machines, had answered my none too few questions, he finally got a breathing spell and with coat and collar off was soon back working over his pet—the motor—which in spite of its two years' service, was now working better than ever and turning up an even 1,300 revolutions.

As it is hoped that Mr. Leonard Bonney, who has recently been making some wonderful flights on the Boland will make some long flights with the machine in the near future, Mr. Boland was engaged in fitting an auxiliary oil tank, while Kemmerle and Hofflich were attaching a new heavy metal tipped propeller. And right here it is instructive to state that the propeller question is one of the great bugbears of hydro-aeroplane work. The Boland people have found that it is no use using thin metal sheeting on a propeller which is constantly hitting spray, because the force of the impact soon wears away the metal and as soon as a little opening occurs, the force of the blows soon spread the metal apart and destroy the blades.

After completing adjustments, the enthusiastic workers called a halt for lunch, during which in addition to devouring their food they also devoured the contents of the latest issue of AIRCRAFT and discussions prevailed on the latest feats of Pegoud, while the writer was called upon to explain the Dunne machine.

It was now time to be thinking of flying and while we could see from the way the smoke was blowing straight back from the dredge's funnel that the wind was high, nevertheless, Kemmerle, after going outside the hangar and looking things over estimated that it was blowing between 20 and 25 miles an hour and flights could be made. It was therefore speedily decided to launch the machine and this I thought would be somewhat of a difficult job, but thanks to a specially designed cradle to which the machine was strapped, it was simply shoved off bodily into the water, the cradle taking all the strain and protecting the floats during the operation. When the machine was in the water a mechanic simply loosened the fastenings and the cradle was pulled from under the floats and anchored to the side of the hangar to be used when the hydro was to be drawn out of the water, when the cradle is slipped under the floats, the machine again fastened to it, the nose of the cradle pulled up on the edge of the hangar, rollers inserted under it and the whole apparatus shoved back ready for the next launching.

After the cradle had been removed, the hydro-aeroplane, thanks to its absence of a tail, was simply swung around with its rear edge just sticking over the front of the hangar. In this position the pilot can mount his seat and the mechanic swing the propeller with the same ease as on the ordinary land machine. For starting on the water a special crank has been devised.

As the wind was high and a new propeller just fitted, Kemmerle started off alone to test things. There had been some discussion as to whether to tow the machine out into the open or for the pilot to try and negotiate around the dredge. It was finally decided to try the latter plan and this narrowly ended in disaster, for before the machine could get any headway on it was caught by the wind and headed directly for the dredge. Kemmerle saw that as there was not space enough in which to turn, and speeding the engine up would only result in hitting the dredge harder, so he immediately throttled the motor down slow and jumping down onto the right float, interposed a big drag on that side which swerved the machine around into the wind and away from the dredge.

He immediately climbed back into the nacelle and opening the motor up wide, headed into the wind, skirting the dredge by a wide margin, and then turning and speeding to the far end of the bay. Here he again turned and heading into the wind was soon into the air and coming directly for us who had set out to render assistance in the motorboat. Upon coming within close proximity to us he made a dive for the boat, coming down to within a few feet of our heads and then swerved off on a steeply banked turn. Kemmerle repeated these tricks several times and then signalled he was going to alight, which was accomplished too close to the dredge so that he was nearly blown into it again.

It seemed several minutes before our motorboat could reach him but at last we got there and a rope was made fast to the water plane and we proceeded to tow the machine around the dredge back to the hangar. The pilot of the motorboat, however, in negotiating the turn did not sufficiently take into account the drift of the wind with the result that the end of the planes hit the dredge and broke the end rib. That dredge was like a magnet endeavoring to draw everything toward it.

After considerable excitement and much pushing and shoving, the hydro-aeroplane was finally pulled away and I was left stranded on the dredge. As I was contemplating whether to get back to the shore by walking along the dredge pipes or waiting for the launch, I was suddenly startled by a loud crash, and turning quickly I saw the pipes nearest the dredge give way owing to the high pressure of the dirt and stones being forced through them, and I was heartily glad I had not persevered with my intention. However, I was soon picked up by the launch and back in the hangar again, where I was glad to learn the damage to the machine was slight and would soon be repaired.

When I returned to the hangar Mr. Newton, of the Boland Company, had arrived accompanied by Leonard W. Bonney, the well known Deperdussin and Wright pilot and a general talk and discussion followed which served to pass away the time until repairs, which consisted of reinforcing the end rib, fitting new braces and straightening out the end tube, had been completed.

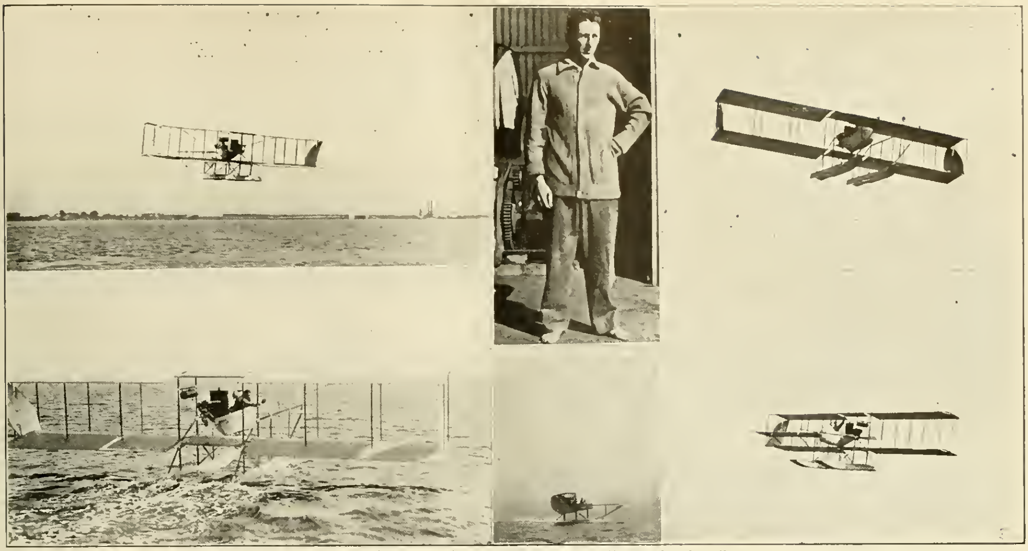
Mr. Bonney, who is now with the Christmas Aeroplane Company, informed us that he was going to fly the new Christmas tractor as soon as a powerful motor of 140 H. P. had been procured and in the meantime he was overhauling the 80 H. P Gnome which he intends fitting to his Caudron. Look out for the American speed records.

The hydro-aeroplane was now ready and accordingly I got into the passenger seat immediately behind Kemmerle and the motor was started by Mr. Boland. After testing the motor awhile and noting by the tachometer that she was giving an even 1,300 revolutions per minute, the pilot gave the signal to let go and we immediately shot out from the hangar. This time, however, the pilot was not forced to go round the dredge for the breaking of the dredge pipes left a clear opening right out into the bay.

Accordingly, with ever increasing speed we shot straight ahead with the wind at our backs, making for the upper bay where we were to turn and head into the wind for the take off.

In making this trip with the wind across the water I was particularly impressed with the feeling of exhilaration and absolute security which it inspired and I longed to take the control wheel and run the machine myself, so easily and safely did she handle.

Although on this straightaway run the pilot made no effort to take the machine off the water, I could see by the way the pontoons were planing and skipping on the top of the water that he probably could have done so if he wished. Whizzing by motorboats, launches, tugs and various other water craft whose salutes we acknowledged with a wave of the hand, we were soon at the



Several views of the Boland machine in action and Horace Kemmerle, the pilot.

upper end of the bay and slowly turning round with the motor throttled.

As soon as the hydro aeroplane was headed into the wind, Kemmerle opened up the trusty Boland motor and the hand of the tachometer flying up to 1,300 revolutions we were soon speeding across the water, and in less time than it takes to write, I noticed that the floats were just skimming on the top of the water and that the machine was practically flying. However, it took a little run after this before we actually rose because owing to the fact that the floats were a little too long in back, as soon as the pilot elevated, their rears would drag in the water and prevent the machine from rising unless a surplus of speed sufficient to overcome this added drag, had been obtained. The lesson to be learned from this is that hydro-aeroplane floats should not be made too long and narrow but rather as short and wide as possible. If, however, long floats are used, for there is no doubt that they promote additional fore and aft security in alighting or when running on the water they should, in the writer's opinion, be made with ample planing surface, and their rear parts sloping upward, so that when a machine is rocked back to take off the water, they do not create an additional drag at this critical moment.

Having given the above few observations, I will now turn to the actual flight. After skimming the top of the water until I judged we were going at more than lifting speed, I noticed the pilot pull the elevator control back and I expected to see the machine take off with a bound, but while we actually started to get off quick, the back of the floats touched and this cut down our speed so that while we did get off we did not jump off as I had expected.

Once clear of the water, however, the machine's speed soon accelerated and looking directly down I saw we were rising. The motion is so gentle and easy that unless one actually looks right down one would hardly know they were rising.

Heading straight into the wind and going towards the hangar, Kemmerle kept his elevator slightly inclined upward and the thing that struck me most was the fact that in spite of the strong wind blowing off the land he did not have to juggle it backwards and forwards as is necessary on a great many machines. The big water plane riding there with its elevator set at a lifting angle, reminded me for all the world like the lifting elevator models which the boys fly. The side balance, also, was very good, and while we were tipped a bit sideways every now and again, I noticed that all the pilot did was to turn his wheel towards the high side and as I watched I could see the flap on that side be pulled in and owing to its peculiar pivoting arrangement (for explanation and drawings of the Boland machine and flap control see March, 1913, issue of AIRCRAFT, pages 58-60) present a downward angle which immediately slowed up the high side and depressed it at the same time.

As we approached the hangar I knew the pilot would turn so I prepared to watch the operation. Upon coming above the dredge, he gave the wheel a sharp turn to the left and immediately the left flap flew inward and downward, setting up a drag and depression which caused the machine to bank steeply and swerve sharply around to the left. So steep was this bank and so strong the wind under the high side of the planes that I must confess to a momentary feeling of fear lest the controls would not work quick enough to avoid a side slip, but to my surprise and gratification the machine completed the turn without the slightest degree of slip and immediately she got around, a turn of the wheel to the right pulled in the flap on the right (the high side) and let out the one on the left, when the aeroplane immediately straightened up and flew up the bay at a great rate.

Kemmerle then turned and heading into the wind climbed a little higher. He made for the hangar and then flew over the dredge to give me a taste of the effect of the smoke coming out of the funnel. It certainly was not lost on me for we got a healthy side swipe which keeled the machine way over and made me do some tall leaning toward the high side. With one slap of the control on the high side, Kemmerle straightened her up and I was convinced of the effectiveness of the controls and enjoyed things a little bit better thereafter.

After making a few more swings of the bay and a couple of switchbacks, the pilot headed direct for the hangar and, shutting off his motor, glided to within a few hundred feet of it and then taxied right to the door.

In conclusion I must speak a word of praise for the Boland motor, for throughout the trip and during the whole afternoon, for that matter, it ran faultlessly and registered an even 1,300 revolutions, apparently without a miss, flying the heavy water-plane with two aboard, and that is no mean accomplishment for only a 60 H. P. motor.

Further, I was greatly impressed with the degree of natural stability the machine showed and also with the manner in which the pilot handled it.

Finally, I want to say that there is no other sport imaginable that can compare with water flying for pure joy and delight.

THE "ENGLISH" MODEL CURTISS FLYING BOAT

Brief Detailed Description of the Water-Flying Craft Glenn H. Curtiss Has Taken to Europe

By LYMAN J. SEELY

Another year of experience, during which he has designed a score of flying boats for sportsmen, is behind the latest flying boat turned out by Glenn H. Curtiss. This machine has been shipped to England where Mr. Curtiss expects to have it demonstrated for a number of British sportsmen, and later to send it to the Mediterranean. At this writing there has been much talk in English newspapers of an Anglo-American flying-boat race between this craft and one of English manufacture. Curtiss' "English" flying boat is designed throughout as a four-passenger machine, and the wing area, hull and every part of the machine has been planned accordingly; this of course results in a craft not quite so fast as the standard two-passenger boat when equipped with Curtiss O-X, 90-100 h. p. motor, but one that will leave the water very quickly and which handles beautifully when carrying a heavy load. Its principal details are:

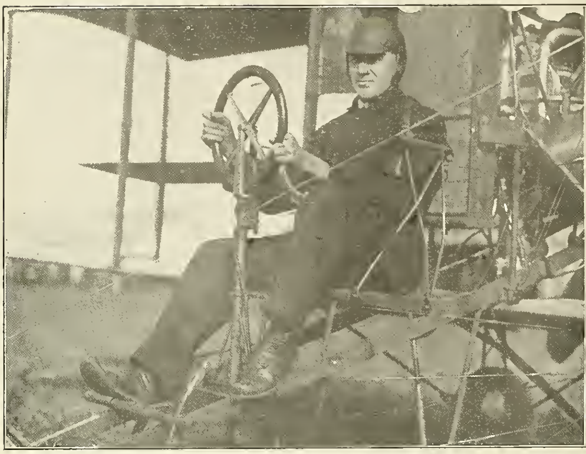
Hull, made of Honduras mahogany, fastened throughout with copper rivets and, outside, with round head brass screws. Both forward and after cockpits are ceiled and panelled with dark mahogany. Cushions are upholstered in dark brown corduroy, and the seat back of the after cockpit is upholstered with the same material. The center panel of the forward deck, or windshield, folds back to form a rubber-covered and cleated gangway. Entrance to the after cockpit is through the forward one, engine supports having been redesigned to leave ample room, and at the same time to decrease head-resistance. The hull is a mono-hydroplane, vee-bottom, with keel extending beyond and below the single step, forming a substantial support when the boat is run high and dry on runway or beach.

The design of the superstructure differs considerably from previous models; the wings are made in one piece, each, and each pair may be detached by the removal of four bolts. The wing structure is stronger and somewhat lighter than the Curtiss panel type. Ribs are narrow and deep; laminated and bound with tape. Beams are laminated, and taper toward the extremities as the load decreases; there are no holes through them, but the ribs are attached with copper straps. Upper wings have a spread of 41 feet; lower, of 30 feet. Surfaces are covered with unbleached linen, treated with a waterproof emulsion which renders them semi-transparent. Ailerons have been increased in area; they now measure 12 feet by 3 feet. They are hinged on the outside rear uprights, and steadied by struts depending from the outer extremes of each upper surface. Each aileron is wired independent of the other, and in case of the disablement of one the machine can be handled with the other.

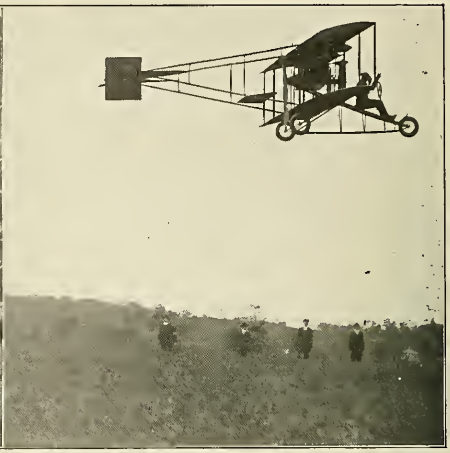
Power plant comprises one of the new Model O-X Curtiss 90-100 h. p. motors, with a new style of radiator, of smaller area than the old ones, but greater capacity. An 8 foot 6 inch Curtiss propeller is attached direct to the motor shaft. Main fuel supply is from two 20-gallon tanks fitted into the corners of the after cockpit. Air pressure forces the gasoline from these tanks to a small gravity tank on the engine bed. Total weight of the machine is approximately 1,300 pounds. Speed, 60 m. p. h

THE AERONAUTICAL SOCIETY'S MEET

Five Aviators Race Round New York City in Gale



W. S. Luckey, who, with a 100 H. P. Curtiss biplane finished first in the recent Aeronautical Society's Aerial Derby and winner of a $1,000 prize.



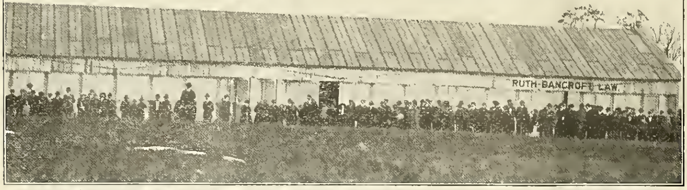
Frank Niles, the winner of a $750 cash prize and second place in the recent Aerial Derby around New York, just starting the flight on his 100 H. P. Curtiss biplane.

THE AERONAUTICAL SOCIETY'S AERIAL DERBY.

Finished.	Aviator.	Make of Machine.	Type.	Start.	Finish.	Elapsed Time.	Prize.
1.	W. S. Lucky	100 h. p. Curtiss	Biplane	3:33:18	4:26:12	52:54	$1,000
2.	Frank Niles	100 h. p. Curtiss	Biplane	3:34:08	4:29:03	54:55	750
3.	C. Murvin Wood	50 h. p. Moisant	Monoplane	3:31:00	4:29:19	58:19	500
4.	J. Guy Gilpatric	50 h. p. Sloane-Deperdussin	Monoplane	3:32:00⅗	4:41:22	1:09:06⅗	....
5.	Tony Jannus	75 h. p. Benoist	Tractor Biplane	3:36:05	4:50:02	1:14:07	....

Wind velocity 43 miles an hour.

The greatest aeronautical meet of the year in America and probably the most important one from the point of achievement in actual flying ever taking place in America was held at the Aeronautical Society's grounds at Oakwood Heights at Staten Island on the afternoon of Monday, October 13th. Instead of the usual trick flying and monotonous round the course flights witnessed at the different meets during the past, an interesting race was provided in which five skillful aviators started from the grounds and flew a distance of 60 miles, encircling the entire island of Manhattan and New York City before they returned. This was called an Aerial Derby and it was probably witnessed by several million people, as the course followed was entirely over the water surrounding New York, so that the people of New York City, Brooklyn, Long Island City, Jersey City, Hoboken and other lesser towns and villages as well as all the people on the various water craft en route, were enabled to witness without any more trouble than by either going to the water front, cross streets or the tops of their buildings.



John Guy Gilpatric just starting his flight around New York City in the Aerial Derby in his new 50 H. P. Gnome motored Sloane-Deperdussin monoplane. Gilpatric's flight was probably the most remarkable one of the race for the reason that he was using a very light machine which made it more difficult to navigate through the very heavy winds encountered, and it speaks well for our American manufacturers of monoplanes in that the machine had only been flown for a few minutes previous to entering the race.

The meet was a success in every way and especially so when considering the fact that a 43-mile wind raged during the race. Every aviator starting completed the circuit without landing and demonstrated thereby to what remarkable extent an aviator's skill may be developed, for it must be understood that not only was a 43-mile wind raging but also the course over which these men flew was one of the most treacherous in the United States owing to the cross currents and choppy gusts continually being brought about by the sky scrapers of New York City and the various water craft with their funnels as well as the thousands of smoke stacks on land.

In fact this was a race in which the aviators' skill was the dominant factor, although it must be pointed out that the construction of the machines was a decided improvement over a year or two ago. The Sloane-Deperdussin monoplane was constructed with extraordinary staunchness, especially in the bracing of the wings and controls. The Moisant monoplane also showed exceptional strength in construction over former machines, while the Curtiss biplanes of Luckey and Niles and the Benoist biplane of Jannus, were strongly built and stood up well to the tremendous buffeting they received throughout the entire trip.

One of the most striking features of the performance was the manner in which an American motor stood the test, for the first and second machines to finish were powered with the 100 H. P. O. X. Curtiss motor, which demonstrated its great reliability. Of course, it must be understood that the foreign motors used in the two monoplanes were of but 50 H. P. each, although the difference in horse power may have been offset by reason of the fact that it requires more power to attain speed in a biplane than in a monoplane, so that taking things altogether, the American motor unquestionably demonstrated its excellent qualities in competition with the best foreign motor made.

In spite of the very bad flying conditions the race began within one minute of the advertised time, which proves that in the future the Aeronautical Society can advertise with certainty races, cross country flights and safe and sane exhibition performances to take place at a stated time without fear of disappointment to the spectators, provided they have a few such skillful pilots engaged as those which took part in this race.

Furthermore, there is no good reason why the

Aeronautical Society should not conduct a series of these aerial derbies periodically so that the vast population of New York and its vicinity may look forward to such spectacles at least once a month, and it is just possible that these meets might be made sufficiently entertaining to attract crowds either every Saturday or at least fortnightly the same as they have been conducted at Hendon, England, during the past two years.

The first to start in the race was C. Murvin Wood in his 50 H. P. Moisant Bluebird, at 3:31. He was followed by Guy Gilpatric in his 50 H. P. Sloane-Deperdussin, who started at 3:32. W. S. Luckey, in his 100 H. P. Curtiss biplane, followed third, starting at 3:33. Frank Niles, on his 100 H. P. Curtiss biplane, flew away fourth at 3:34, and Anthony Jannus, on his 75 H. P. Benoist tractor biplane, started fifth and last at 3:36. All the aviators encountered severe eddies when leaving the aerodrome and consequently rose a considerable height in order to seek a steadier level and avoid as far as possible the treacherous currents which they knew they would encounter while going around the city. An interesting point is that all the aviators reported encountering worse air conditions in the vicinity of Spuyten Duyvil and Fort Washington at the upper end of the city than over the city itself.

The first machine to be seen returning to the field was a Curtiss biplane which turned out to be that of W. S. Luckey, who crossed the finishing line at 4:26. He was soon followed by Frank Niles, also on a Curtiss, who finished at 4:29:03; Murvin Wood closely followed him on the 50 H. P. Moisant Bluebird, finishing at 4:29:19. The race between Niles and Wood was quite exciting. Guy Gilpatric on the Sloane-Deperdussin did not arrive until 4:41:22 having steered a longer course over Brooklyn. Anthony Jannus, on the Benoist biplane finished fifth and last, crossing the line at 4:50:02. His flight was remarkable for he used a light weight large surface Benoist tractor biplane equipped with only a 75 H. P. motor which consequently made his machine considerably slower than the others and made his fight against the elements perhaps the most difficult achievement of the race. It was noticeable that while all the machines appeared to be fairly steady when approaching the field at a high altitude as soon as they got low over the aerodrome they were rocked and pitched about to a considerable extent. However, all made good landings and thus in spite of the trying conditions every one of the five machines which set out on the difficult trip, returned safely to the starting point, thus making the Aeronautical Society Meet the most successful held in this country.

Besides three silver cups, offered by the Aeronautical Society, *The New York Times* put up prize money amounting to $2,250 for the three winning contestants of the Aerial Derby, and after going over the reports of the judges stationed at the different controls, the starters officially announced the awards as follows: W. S. Luckey, first prize, $1,000; Frank Niles, second price, $750; C. Murvin Wood, third prize, $500.

One important feature of the meet was the fact that a committee of inspection was appointed to pass upon the construction and efficiency of the machines entered and who very properly refused to permit several entrants with poorly constructed machines to fly.

One thing which the Aeronautical Society must do if they ever hope to make permanent successes of future meets, is to induce the Staten Island railroad officials to give better train service, especially returning from the field, and if possible to run a branch line direct to the field and beach if it is intended to give airboat contests during the coming spring and summer. It is to be hoped that the Aeronautical Society can prevail upon the railroad authorities to do this for the public has begun to show its willingness to attend these meets but the Society cannot expect to get large crowds unless the railroad can take care of them which they cannot do at the present time and besides the present inconvenience of waiting for trains and getting in the awful crush one has also to walk a considerable distance to and from the field and beach.

William S. Luckey, winner of the aerial Derby, is one of the surprises aviation is continually springing. Just about a year ago this old-young man appeared at the Curtiss Flying Camp in Hammondsport and reported to Glenn H. Curtiss for training as an aviator. He was approaching the half century mark in years, with liberal streaks of grey in his hair, and on his face the resigned expression of the tired business man. For years he had been a manufacturer in New York, turning out trunks and suitcases for fortunate travellers, but now he had decided to take his turn at roaming and proposed to travel through the upper air. It was almost funny to think of this sedate-looking gentleman starting out to outdo the youngsters of the air. But Luckey's training in business stood him in good stead and by methodical plugging he soon learned the management of the machine. His name proved a misnomer, however, during his early exhibition flights late last fall. Hard luck followed him and it was with some trepidation that he started in this season. He stuck to it, though, and his final mastery of the intricacies of aviation may best be testified to by those four hardy fliers who with him fought their way around Manhattan's skyscrapers in the teeth of a 43-mile wind. Luckey maintained an average speed of more than 70 miles an hour, accepting straight lines between the marks as the distance travelled. Luckey believes he traveled at least ten miles further because of the side drift and his anxiety to round the turns with plenty of margin. Luckey had been crippled up with rheumatism for ten days preceding the race and his win in the face of prevailing weather conditions should prove to the most skeptical that while safe flying does demand at least as much judgment as wheeling a baby carriage, it assuredly does not demand the squirrel-like agility depicted in many newspaper editorials.

Tony Jannus, who finished fifth in the race with a 75 H. P. Benoist Tractor biplane, and J. R. Hall, the General Director of the Meet, who made several flights with Jannus.

It should be pointed out that Jannus entered this race with a large surfaced, passenger carrying machine, whereas all of his competitors drove single-seaters.

Charles Niles, who finished second in the race, is a perfect contrast to Luckey. Niles is a youngster, full of "pep" and ready to try anything once. His machine was a duplicate of Luckey's and fitted with a similar 90-100 H. P. Model O-X Curtiss Motor. A comparison of his elapsed time in the race would suggest that his machine is two seconds to the mile slower than Luckey's, but it is more likely that he flew at a different level or encountered slightly rougher weather somewhere along the route.

C. Murvin Wood, who finished third in the race, is one of the very best monoplane flyers in the United States. He learned how to fly at the Moisant School of Aviation and later became an instructor. Mr. Wood made one of the most spectacular flights in this country this year by beating the railroad train on a race between New York and Washington. He has just been engaged by the Guatemalan government to act as an instructor for its Army Aviation Corps during the next year.

John Guy Gilpatric, who finished fourth, learned to fly at the Sloane School of Aviation at Hempstead Plains and exhibited such splendid qualities as an aviator that he was immediately employed by the Sloane Company to act as an instructor for the Sloane School. He has met with just as good success in training students as he has in making demonstration flights and in races.

Tony Jannus is one of the best known aviators in the United States, having made numerous long distance cross-country flights, one in particular being that in which he flew down the Mississippi last year in a Benoist hydro-aeroplane. Mr. Jannus has been with the Benoist Company for several years and is a very capable and efficient demonstrator of that companys very successful over-land and over-water machines.

Flying Boats Attend Aeronautical Society Meet

THAW AND MAC GORDON FLY FROM NEWPORT.

Two longer flights than those of Luckey and Niles were made only a few days before the around Manhattan race without provoking any vast deal of newspaper comment. Both of these flights were made with Curtiss Flying Boats owned and piloted by this summer's graduates of the Curtiss Training Camp. William Thaw and Steve MacGordon, who for several weeks have been entertaining society at Newport, flew down to New York in time for the celebration. Their first jump was from Newport to New Haven. There they visited a few days and October 7 flew from New Haven to New York.

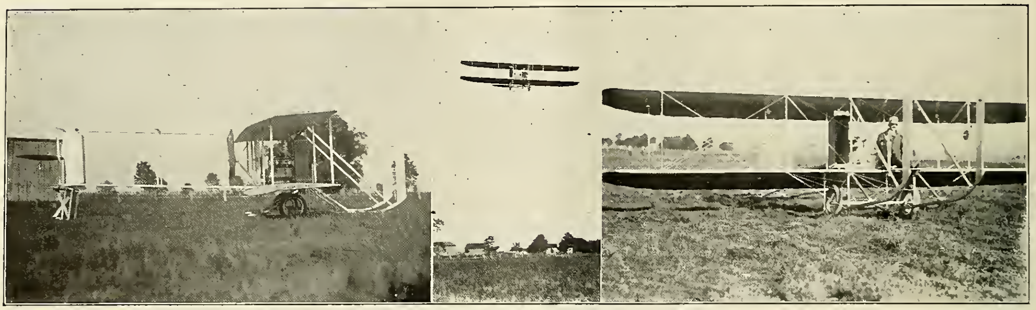
ALBANY TO NEW YORK IN FLYING BOAT.

A few days later J. B. R. Verplanck and Beckwith Havens, the flying boat cruisers, finished the long journey that started from Chicago last July with a flight from Albany to Staten Island.

C. Murvin Wood, who finished third in the race around New York, and winner of a $500 cash prize, and the new 50 H. P. Gnome motored Moisant monoplane, designed by Harold Kantner. It was with this splendid machine that Mr. Wood recently flew from New York to Washington.

THE NEW WRIGHT MODEL "E" SINGLE PROPELLER BIPLANE AND THE NEW WRIGHT SIX-CYLINDER MOTOR

By GROVER CLEVELAND LOENING, B.Sc., A. M., C. E.



Three views of the new Wright Model "E" single propeller biplane.

The Wright Company have recently brought out a new type of machine for exhibition work called model "E," which is the first product of the Wright company equipped with only one propeller. This machine is a small single propeller biplane with the customary Wright controls, but differs considerably from previous Wright products in details of construction.

A four-cylinder Wright, water cooled motor is mounted alongside of the operator. The motor drives by chain the single central propeller. The tail spars supporting the rudders are spread wide apart so as to clear the propeller. The motor, seat, gasoline tank, radiator and propeller drive are all concentrated in one center section which is 4 feet 6 inches wide. On either side of this, by means of readily demountable fittings, are attached the wings, consisting of a cell of only two panels. The tail spars are likewise attached to the center section by demountable fittings, so that to take the machine down, it is only necessary to take off the wings on either side, and the tail at the rear, making the largest remaining dimension about 14x5 feet.

The wire fittings at the base of the strut on this new machine are a novel hook arrangement of great simplicity, making it possible to undo the wires merely by taking out the strut and loosening them up. As in previous joints on Wright machines the strut is held in place by a pin, and in this fitting the hook plate is the base plate of the strut. With the wires in the hooks, as soon as the strut is put into place the wires are locked in.

The landing chassis is exceedingly simple, resembling very much the landing chassis on the well-known Wright type "C." Two 24x4 inch wheels are mounted to the customary Wright skids.

A finished detail which is very effective is the manner in which the front blinkers are constructed of wood, quite rigidly fastened to the front of the skid, and doing away with much of the wire bracing formerly used.

The details of the control mechanism between the levers and rudders are quite different from other types of Wright aeroplanes, because of the necessity of clearing the propeller and of protecting the wires and cables at points in the vicinity of the propeller tips. The vertical rudder is 16 inches in depth, 3 feet 11 inches in height, of the usual biplane form, pivoted in a balanced position. The elevator is 12 feet wide by 2½ feet deep. The wings of this machine are covered with linen, treated with a new preparation which have been evolved after a long series of experiments at the Wright plant, and which gives an excellent finish to the cloth, without at the same time causing it to tighten too much. The finish given to the entire machine is typical of the fine work that is being turned out at the Dayton factory, and the neat appearance of the machine is most pleasing.

This machine has been designed particularly to meet the requirements of exhibition flying, which calls for a light, handy machine, easily taken down and set together, occupying little space, and possessing plenty of climbing power and speed.

The new Wright is the result of studying seriously the exigencies of the exhibition situation, and model "E" is the first big step towards making it possible for exhibition flyers to meet the larger number of dates, and reduced prices by a corresponding reduction in the expense of handling their machine. Although the flying characteristics of the machine are a little different from the two propeller type, they are readily learned by a good flyer.

The span of model "E" is 32 feet, the chord is 5 feet and the surface area approximately 316 square feet. The total weight ready for flight is only 720 pounds, which makes the machine all the easier to handle on and off cars, and in getting around from place to place.

During the past month on various occasions, Mr. Orville Wright has been flying this new machine at Simms Station, putting it through a long series of tests. The machine handles well in the air, is remarkably easy to land, and quick to start. A recent test of the time it requires to take down the machine was made, and it took only 12 minutes after rolling it into the hangar at the conclusion of a flight to get it ready for shipment.

The New Wright Six Cylinder Motor

The new Wright six cylinder motor, which is a development of the "six" first brought out at Dayton in 1911, has lately demonstrated very high efficiency, and excellent reliability. Harry N. Atwood, who is flying a Wright type hydroaeroplane at Toledo is the first to use one of these new motors, and the unusual performances of his machine with the new equipment at Toledo have created a very sound enthusiasm. Though not trying for "stunt" records, but rather to demonstrate reliability and consistent good performance, Atwood caused a good deal of excitement and interest when he flew with great ease on September 27th with Mr. Frank R. Coates, of Toledo, who is the president of the Toledo Railways and Light Company. Mr. Coates weighs 295 pounds, and though flying boats and hydros visited Toledo this summer, none had been able to get Mr Coates into the air. This made Atwood's performance all the more appreciated by those who are following his demonstrations there, and was a very obvious proof of the efficiency of his equipment. In addition to Mr. Coates, many other sportsmen of Toledo have been making numerous flights with Atwood. Among them were Nathaniel Paige of the General Electric Company, and E. Lee Miller, who has made flights in many different types of marine aircraft, but is most enthusiastic over Atwood's six cylinder Wright.

The new motor, 4⅜x4½ inches, as were the old ones, has been vastly improved in construction. The ports have been made larger, and both exhaust and intake are now mechanically operated. A novel feature which insures economical use of fuel and a safe and convenient means of throttling down is the fitting of "Zenith" carburettors.

As this is the type of motor to be used in the new type of Wright aeroboats, the demonstration of its excellence for water flying is of considerable significance. The weight of the motor complete is only 265 pounds, and it is said that the power developed is over 70, on the Wright type machine.

Atwood consistently succeeded in making his Wright type machine with this new motor get off the water with a passenger in less than 15 seconds, climbing at nearly 300 feet a minute, and with an air speed that is easily varied from 42 to 56 miles an hour, a combination of greater safety, due to the low landing speed, with higher speed for cruising being obtained.

NEWS IN GENERAL

By D. E. BALL

Western News

By Dr. E. R. Carey.

Sutro, flying his hydroplane (Hall Scott motor and twin tractor screws), carried four passengers over four miles in three minutes and forty seconds. This broke several American records for weight carrying, number of passengers, duration and altitude over the water.

Harry Christofferson has been using a Christofferson Curtiss type hydroplane at Salt Lake and recently made a cross country flight to Provo, Utah.

Blakely, the Benoist pilot, was engaged to fill a two days' engagement at the Messa County Fair at Grand Junction Colorado. During one of his flights he hit a tree top and fell 30 feet to the ground. He had started to descend when he found he was not high enough to clear some telephone wires. The machine turned over after hitting the tree, pitching Blakely out. He was bruised and the plane wrecked. This again calls attention to safety of tractor type as Geo. Thompson was killed at Lamar, Colorado, last year in a Mathewson owing to similar accident.

Roy Francis recently flew his twin tractor at Cape Girardeau, Mo. A previous exhibition last spring was given by the Benoist Co., when Jannus was opening up to Mississippi Valley to the hum of the motor.

Robert Fowler, the "twice across the continent" man, seems to find Colorado air too thin to grip his planes, as the second attempt to fly at the fourth annual Trinidad Los Animas fair resulted in a smash. He attempted to leave the ground at five o'clock, raised, sailed a quarter of a mile at about thirty feet, when he had to dive to keep from hitting some telegraph wires, smashing his propeller and running gear. He was pretty badly shaken up, though not seriously bruised. The altitude is well over 6,000 feet.

Jack Shephard has a Gnôme type rotary motor almost ready for trials. These will take place in Pueblo.

Georges Mestach, the Borel-Sommerville pilot who was in the Gill accident about a year ago, came nearly meeting Gill's fate when his monoplane capsized at Albuquerque, New Mexico, October 7th. The machine capsized and plunged fifty feet to the ground, smashing it beyond repair, giving Mestach a shaking he will remember. He was not seriously hurt, however.

Miss Stinson has been filling engagements at Helena, Mont., with her usual splendid style in the Wright model Ex.

Frank Champion, who has been touring Oklahoma, Colorado and Nebraska with his Blériot copy, is reported flying in Wisconsin.

Martin flew his convertible tractor in Southwestern Iowa during the latter part of September. He is understood to be preparing to go back to California for the winter.

The papers report that Knabenshue is still experimenting with his dirigible and that the recent alterations have increased the speed materially, as well as its control.

The Cooper Airship Co. are still selling stock and giving trip privileges with the stock. The design of the model embraces excellent features. It is of the rigid type. We understand the office of the company has been moved to Chicago, though it is Colorado men's invention.

Pennsylvania News

By W. H. Sheahan

Aviator George Gray entertained the large crowds that assembled at the Philadelphia County Fair held in Byberry, September 16th-20th. Successful flights were made twice daily, regardless of weather conditions.

The flights on the 17th were made in high winds and on the 20th Gray flew during a rainstorm. Several passengers were carried on the final day. Gray's Burgess-Wright has been kept busy this summer giving exhibitions and carrying passengers at the various seashore resorts along the Jersey coast. Gray claims a record of over 4,000 flights, with but few mishaps and no serious accidents.

Audrey Stewart, of Allentown, who built a biplane for his own use, made a balloon ascension and parachute drop at the Allentown Fair September 25th.

The Aero Club of Penna's Balloon, Pennsylvania I, made an ascension September 17th, with Pilot Atherholt, of Philadelphia, and Dr. Jerome Kingsbury and T. H. Bridgman, of New York, as passengers. After a flight of approximately five hours a landing was safely made at Flagtown, N. J., a distance of about fifty miles from the Holmesburg grounds where the start was made.

The landing was a forced one on account of the rain and light breezes. The passengers in the above flight are making preparations for pilot licenses as aeronauts.

A second flight was made the following week, with the balloon in charge of Clarence P. Wynne, President of the Aero Club of Penna. with Dr. Kingsbury and Kendall Banning, of New York, as passengers. A start was made in the afternoon from Holmesburg and the trip of forty miles ended when a landing was made later the same day at Elwood, N. J.

In passing over the Jersey forests near Hammonton a deer was sighted by the aeronauts, the balloon sailing low at the time was seen by the animal and a chase of nearly two miles ensued, finally ending by the deer disappearing in the thick woods. Dr. Kingsbury and Mr. Banning are members of the Provincial Aviation Corps of New York which organization is shortly to be affiliated with the National Guard of that state.

The Club meetings of the Aero Club of Pennsylvania were resumed for the year when the first meeting for the season was held in the rooms of the Engineers' Club of Philadelphia, on October 3d; a good attendance was on hand and various subjects of interest discussed.

Grover Bergdoll, the Wright pilot who went to Paris the early part of September with the intention of purchasing a Deperdussin and entering the Gordon-Bennett, returned to Philadelphia, on September 31st, accompanied by his mechanician Charles Kraus, Jr. In a report to the Aero Club of Pennsylvania, Bergdoll states that he was practically forced out of the race by the action of the French manufacturers. There is talk of building a Gordon-Bennett racer at the aeroplane factory which Bergdoll says he intends to start.

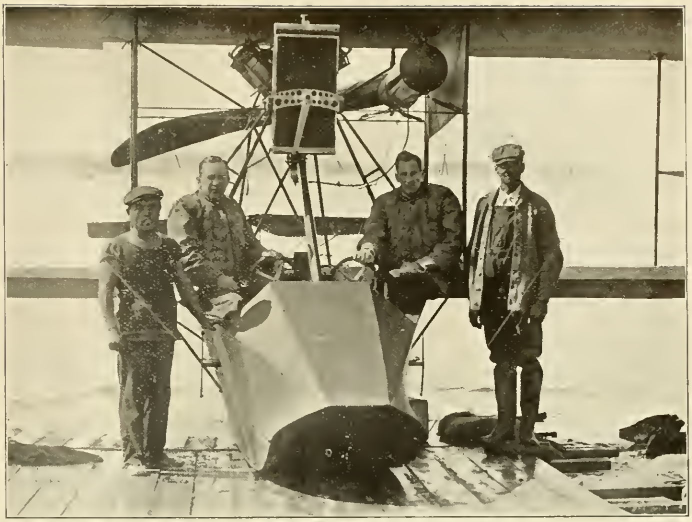
It is Bergdoll's desire that America be at least represented in the race of next year even if it should not be possible to lift the cup.

Plans are being made and it is expected that the matter will be settled definitely within a few weeks. Ardent support of the Aero Club has been promised him in the event that he decides to build a cup machine.

At the October meeting of the Philadelphia Aero Club this organization combined with the Aeronautical Club of Philadelphia. New officers will be elected at a meeting to be held October 17th.

It has been decided to build a large hydroaeroplane during the winter months and have same in readiness for early tests on the Delaware River next spring. Both of the above clubs are junior enthusiasts and number on their rolls some celebrated model flyers.

George Peddle, builder of the fine Blériot described in last month's issue has removed his mono from the Bergdoll hangar and is at present constructing a special type monoplane on original lines for J. H. Wilson, Jr., of Poughkeepsie, N. Y. Recent tests of the propeller and 120 H. P. Chenu motor, with which the plane is fitted, gave a thrust of over 500 pounds at 1350 r. p. m. Peddle expects to soon pass his license tests for aeroplane pilot on his Blériot.



George von Utassy seated in the machine on the left, and J. A. D. McCurdy on the right, in the former's Curtiss flying boat with which they have been making successful flights all summer at Port Washington, Long Island, without the slightest mishap.

Seattle News

By Paul J. Palmer.

On Monday, September 22nd, Airman Edward Steele left North Bend, Coos Bay, Oregon, on a hydro-aeroplane trip to Yaquina Bay, Oregon, a distance of 120 miles. After covering a distance of about 35 miles, he was forced to land at Gardiner, Oregon, on the Umpqua River mouth. Leaving Gardiner, he flew to Waldport, a distance of 50 miles. At Waldport, motor trouble caused delay, and on Thursday he flew from Waldport to Toledo, at the head of Yaquina Bay, a distance of 45 miles. Time reported, 1 hour 35 minutes. This is claimed by Airman Steele to be the Pacific Coast record for over-ocean flight.

Herbert Munter has been doing some flying in his 60 Hall-Scott motored biplane. He has ordered a new motor, and is awaiting its receipt. The Munter plane is 28-inch spread 4 feet 6 inches chord, single surfaced, three-in-one control, Curtiss type; weight, 720 pounds, with operator. Mr. Munter claims the distinction of being one of the youngest airmen in the game, he being 18 years old

Mr. William B. James expects to leave shortly for one of the Eastern training schools, where he will take a training course in land plane operating.

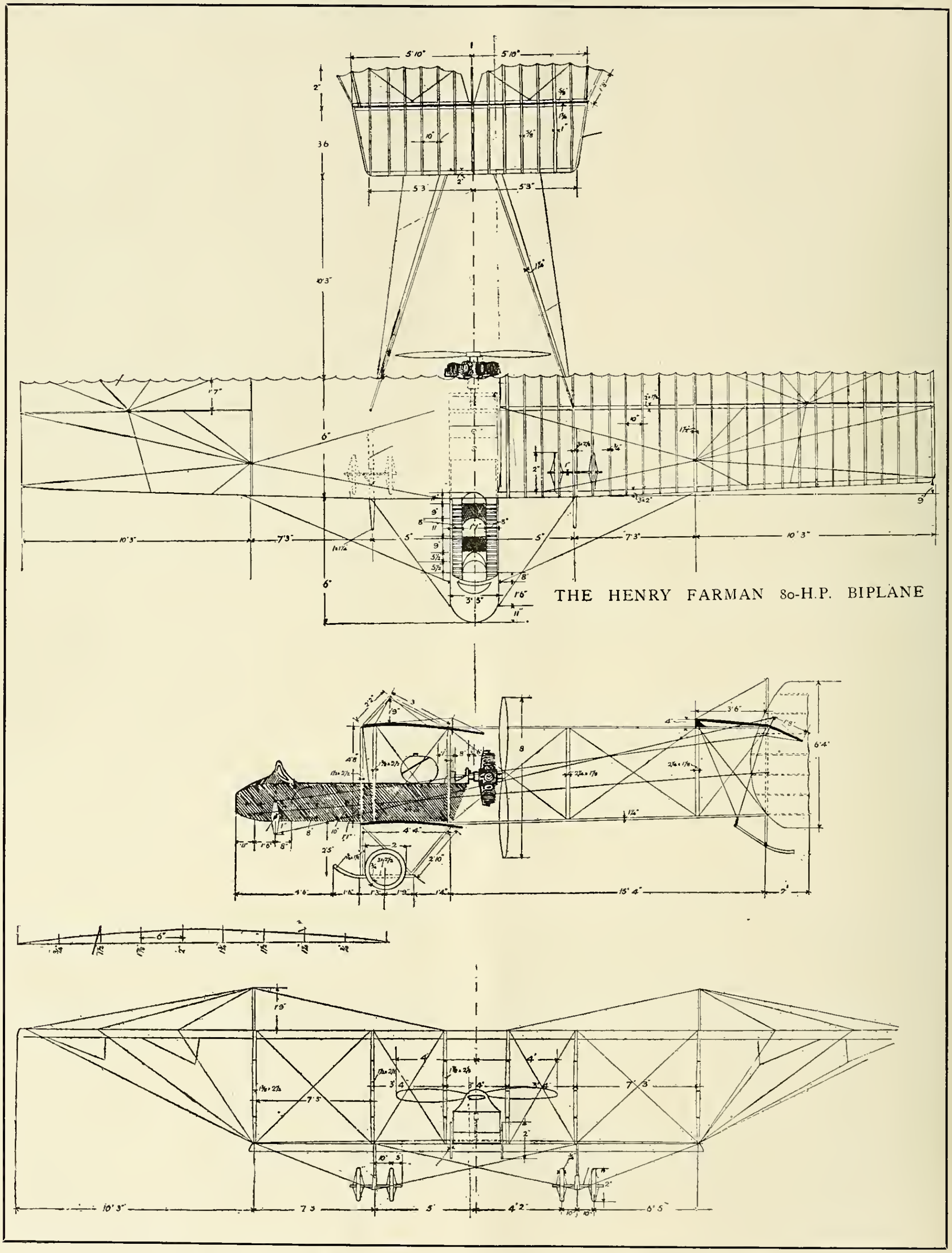
Mr. James V. Martin has returned from a very successful exhibition tour of the important Alaska towns, this being the first flying ever had in the Territory of Alaska. He will "lay-to" in Seattle for a while. Plans unannounced as yet.

Mrs. John Bryant-McKee, the Coast aviatrice, plans to encircle the tower of the 42-story Smith building for motographic purposes. Owing to the presence of several hills and valleys converging to a meeting point near the building, numerous air currents are set up which tend to drive the plane into the building, according to the reports of aviators like Silas and Harry Christofferson, Takasow, Frank and Johnny Bryant, who have attempted to do this feat. Mrs. Bryant intends to lecture on "Aviation," and will use the pictures secured of her in her lectures.

Mr. Philip Rader, who arrived here the latter part of last month with a Curtiss flying boat, has had trouble in getting repair parts, and as yet has been unable to carry out his proposed "Lake Washington Aerial Ferry." Lake Washington is an ideal hydro-flying "ground," the winds being very continuous and lacking in gusts. The lake is 26 miles long and 5 miles wide. Great for "Batboat" races.

Two views of the hull of the latest Thomas flying boat, which is constructed of sheet metal over a frame of two-ply wood. The hull is made in two separate parts, each section containing several air-tight compartments, which make it practically unsinkable. The new shape of the nose has been arrived at after considerable study and experimenting with various shapes of hulls, with the result that the new boat pushes practically no bow wave when running on the water and rises very quickly. In fact, the complete flying boat with this hull has been timed to get out of calm water with two aboard in less than ten seconds.

SCALE DRAWINGS OF THE 80-H. P. HENRY FARMAN BIPLANE.



Top, Side and Front View Drawings of the Three-seater Model.

Curtiss Notes

The latter part of September at Hammondsport Francis Wildman devoted several hours to testing the new four passenger Curtiss machine before it was shipped to England. Wildman flew it alone and with two, three and four passengers, and in every instance it behaved nothing short of admirably. A climb of nearly 2,000 feet was made with four passengers averaging 155 pounds each, and even with this unusual weight Wildman was able to make steeply banked turns and all ordinary maneuvers with the greatest of ease. A series of speed tests over a measured mile with and against the wind, showed an average of exactly 60 m. p. h. The principal points of divergence between this and previous flying boats are: The solid mahogany hull is still wider and higher than earlier boats. Wings are of one piece, forty-one feet spread upper surface, thirty-one feet spread lower surface, chord 61 in. Construction work on hull and planes is greatly improved, and both are now lighter and stronger. Surfaces are covered with unbleached linen treated with the new semi-transparent waterproof preparation. The light yellow wings on the dark mahogany hull make a very handsome machine.

MORRIS FLIES FOR PILOT LICENSE

Raymond V. Morris found opportunity the last week in September to fly for his pilot license which he secured easily enough. Morris intended to try for his license early in the year but exhibition flying during May and June and his work as ... with Hanley of Providence since then ... busy. Mr. Hanley has been flying ... on Narragansett Bay.

RECENT ARRIVALS

Sergeant Samuel Katzman, of West Point, joined the training class on Lake Keuka recently. Katzman seems to have started out with the intention of learning everything possible that might be of value to a military man. He recently completed an engineering course. Baxter H. Adams from Kentucky also joined the training class recently. Wildman is flying hundreds of miles each day with his new flying boat and expects to graduate the present class before cold weather sets in. Most of the recruits at this season expect to join the San Diego class of November 15.

Flies 82 Miles in Bad Weather

Lieut. P. N. L. Bellinger, U. S. N., in the Navy's new Curtiss flying boat, made a double round trip between Hammondsport and Penn Yan in the face of almost impossible flying conditions. Bellinger started out with a passenger and fuel enough for an eight hours run. There was a light southerly breeze blowing when he started shortly after dawn, but as the sun came over the hills surrounding Lake Keuka a violent wind storm developed. It blew first from the north, then settled in the southwest, increasing steadily in speed until it was blowing more than 35 miles an hour. Bellinger fought it out for two complete circuits, a distance of 82 miles, which he accomplished in 78 minutes, and then decided discretion to be the better part of valor.

Navy Makes Interesting Tests With a New Machine

On October 1st Lieutenant Victor Herbster, one of the naval aviators, tested a new Wright machine specially designed by naval men for experimental work. The machine will be fitted with different boats and controls for purposes of experimentation. Lieutenant Herbster has already made a successful flight in it, accompanied by Brannan, the mechanician. At present the machine is fitted with a six cylinder Wright motor, and a boat made of Duralmin metal, a composition of steel and aluminum made abroad.

Aviation Students Fly High at the Curtiss School

Instructor Francis Wildman at the Curtiss Training Camp has been giving his more advanced pupils some practice in altitude recently. As a rule the practice flights are made at an altitude of about fifty feet but lately the 2,000 foot level has been passed each day. Wildman as passenger has allowed each of the students free control of the machine and given each one fifteen minutes in which to climb. Baron Solbrig is said to have reached 3,400 feet in his fifteen minutes. J. D. Hill and Frank Thalmen nearly equalled this height. L. D. Sperry has been making flights of about ten miles alone in the machine, confining himself to landings and right-hand turns. He will be ready for the license tests soon. Baxter H. Adams and Samuel Katzman are making good progress. Sergeant Katzman expects to finish up here, but Adams will complete the course at San Diego in order to get all possible experience.

Japanese Taking up Flying

Of four students enrolled at the Curtiss Aviation Camp during the first week of October three were Japanese. One was a naval officer who served through the Russo-Japanese war; the second a student from Columbia University, the third a business man from Seattle. Glenn Curtiss has had more than a dozen Japanese students of aviation during the past two years, some of them detailed by the Japanese Navy, some of them civilians who take up flying on their own initiative. Francis Wildman, chief instructor at the Curtiss flying camp, says his Japanese pupils have no idea of fear and his chief difficulty is to teach them caution.

Newport Society Much Interested in Flying Boats

The aviation craze has hit Newport since the arrival of the flying boats belonging to Gerald Henley and William Thaw and the disciples of the flying boat have multiplied almost daily. Everyone seems fascinated with the sport, age nor extreme youth seeming to be any bar. Mr. Livingstone Ludlow, 70 years old, and prominent in society both in Newport and in New York, seemed as keenly enthusiastic after a flight as was beautiful Miss Margaret F. Andrews, one of the most popular debutantes of the season. Among Mr. Thaw's guests on October 4th, were Miss Andrews, Miss Margaret Mason, daughter of Mr. A. L. Mason; Mr. Harford, Mr. W. H. Powell, Jr., and Mr. James A. Bonsack, Jr. Among the interested spectators were Mrs. Reginald Norman, Miss Katherine Neill, Miss Elizabeth Sands, the Misses Mary and Esther Moreland, Miss Elizabeth Powell, and Messrs. Henry E. Oelrichs, E. Livingstone Ludlow and George Henry Warren, Jr.

Army Needs Aviators

In the event of a war it is doubtful whether a score of men could be found in civil life in this country who could be utilized by the army in aeroplane work, in the opinion of Brig. Gen George S. Scriven, chief signal officer, in charge of the army aviation corps.

In speaking about this critical situation, Gen. Scriven recently said:

"The army must look to itself and to the men of the organized militia, to supply a reasonable number of officers for military aviation in case of necessity."

Knabenshue Dirigible Makes Successful Flights

During the month Roy Knabenshue in his reconstructed dirigible made several successful flights around Pasadena carrying two passengers and rising over a thousand feet in the air.

William E. Scripps Using His Flying Boat Regularly

Commodore William E. Scripps, the noted yachtsman and recent purchaser of a Curtiss flying boat, has been using it regularly round Detroit and carrying numbers of passengers and arousing great interest in the new sport, and it looks as if next year there will be several more Detroit converts to the joys of aero boating. He has been giving a series of demonstrations to the members of the Adcraft Club and also at the Detroit motor boat club where he is showing the speed boat enthusiasts what really hack numbers they are with their so-called high speed boats.

The First New York Air Commuter

On the morning of Friday, October 10th, Mr. Alfred W. Lawson became the first New York air commuter by flying from his country residence at Seidler's Beach, Raritan Bay, New Jersey, to the foot of 75th Street, North River, New York City, covering a distance of 35 miles in 31 minutes.

As soon as the airboat was safely docked he went directly to his office at 37 East 28th Street by the subway, arriving there an hour earlier than usual, owing to the fact that it requires over an hour and a half to make the same trip by railroad train and trolley car.

Mr. Lawson is the first air commuter in the world who both owns and pilots his own flying boat.

Toledo, Ohio

Toledo is now to become a live aviation center. Harry N. Atwood has just established a flying station on the edge of Lake Erie, at the Casino, which is about fifteen minutes out of the center of the city.

Atwood during the summer was engaged to fly at Toledo Beach by the Toledo Railways and Light Company. His success was so pronounced that the company arranged with Atwood to locate in Toledo permanently.

Atwood has two machines, a Wright hydro-aeroplane with a new Wright six-cylinder motor, and a flying boat built by himself. He expects soon to have a new type of Wright machine. Atwood proposes to devote himself to the development of the sporting possibilities of aviation, in which direction he has made great progress during the past summer. Weekly he has passengers coming to Toledo from all parts of Michigan, Ohio and Pennsylvania. Many of these people are enthusiasts who contemplate owning their own flying boats.

During the week ending October 8th Atwood made six cross-country flights. These attracted much attention, because on some of them he carried passengers. He flew at Swanton, Ohio, and also at Oak Harbor, Ohio. Atwood's activities around Toledo have pointed out the way to many aviators of the splendid possibilities in this part of Ohio for establishing aviation stations. Flying conditions are excellent. Just recently the Thomas Brothers, of Bath, visited Toledo and were so favorably impressed that they are now considering establishing a school there.

New Burgess Tractors for the U. S. Signal Corps

Three tractors ordered in the summer from the Burgess Company and Curtis to be built along the lines of the Burgess Tractor delivered to the Signal Corps in the summer of 1912, are now completed.

Dimensions of the new machines are exactly similar throughout to the original. Many refinements are noticeable. The wing sections have been made of the same dimensions top and bottom and are thus interchangeable. The center upper panel is of the same width as the fuselage with the two small sections on either side, thus doing away with a central juncture of the upper wing and the uprights immediately in front of the operators.

A wind shield is provided and ample room for instruments. Seats are upholstered and neatly finished in leather.

The machine is supported on two pairs of vertical braces instead of diagonal braces as formerly, simplifying not only the number of spare parts required for emergency equipment, but also greatly reducing time required for installation.

The new Burgess treated Irish linen is furnished on the fuselage, wings and rudders. This has been found to increase the speed of the machine considerably and is absolutely weatherproof.

The gasoline supply is carried in two tanks supported on each side of the fuselage and is fed to the engine by gravity, thus doing away with the added complication of pumping devices at a cost of slightly additional head resistance.

The machines are equipped with mahogany Burgess propellers of the two-blade type.

Excelsior Propeller Company Meeting With Success

Mr. M. J. Stone, representing the Excelsior Propeller Company, of St. Louis, Mo., met with such great success with this make of propeller on his recent Eastern trip, that this concern have announced their decision to open up a branch office in California, so that Mr. Stone can introduce and demonstrate the excellent qualities of the Excelsior propeller to the California trade. He has gone to the Pacific coast for that purpose.

Statement

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(Signature of editor, publisher, business manager, or owner.)

Sworn to and subscribed before me this 16th day of September, 1913.

ELSIE C. DUFF,
Notary Public of N. Y. Co.
(My commission expires March 30, 1914.)
Seal.

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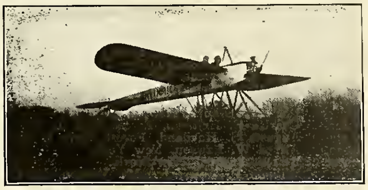

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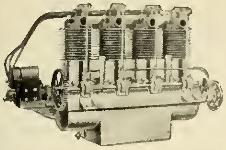

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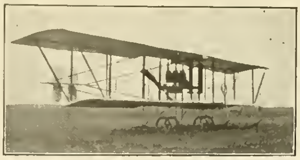

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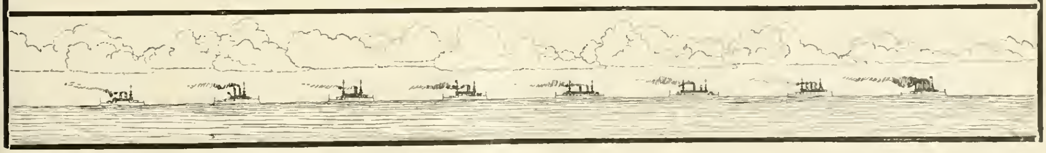

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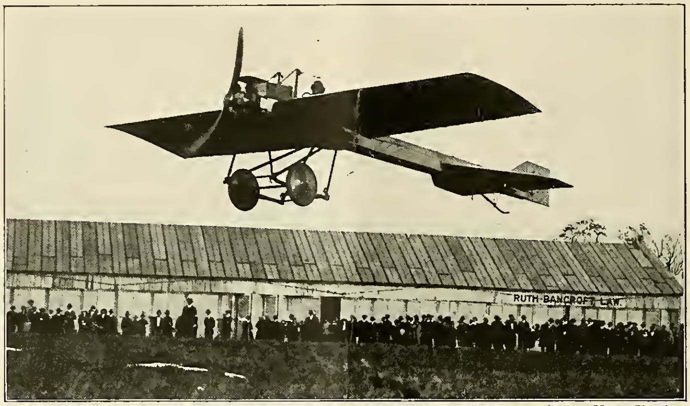

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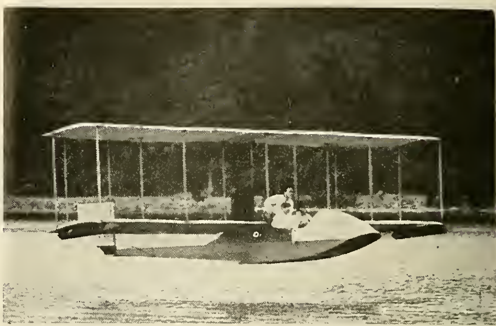

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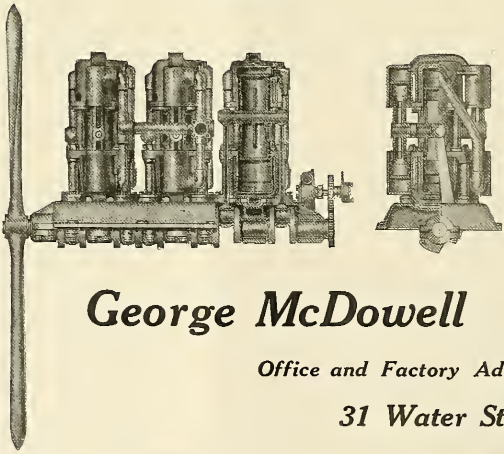

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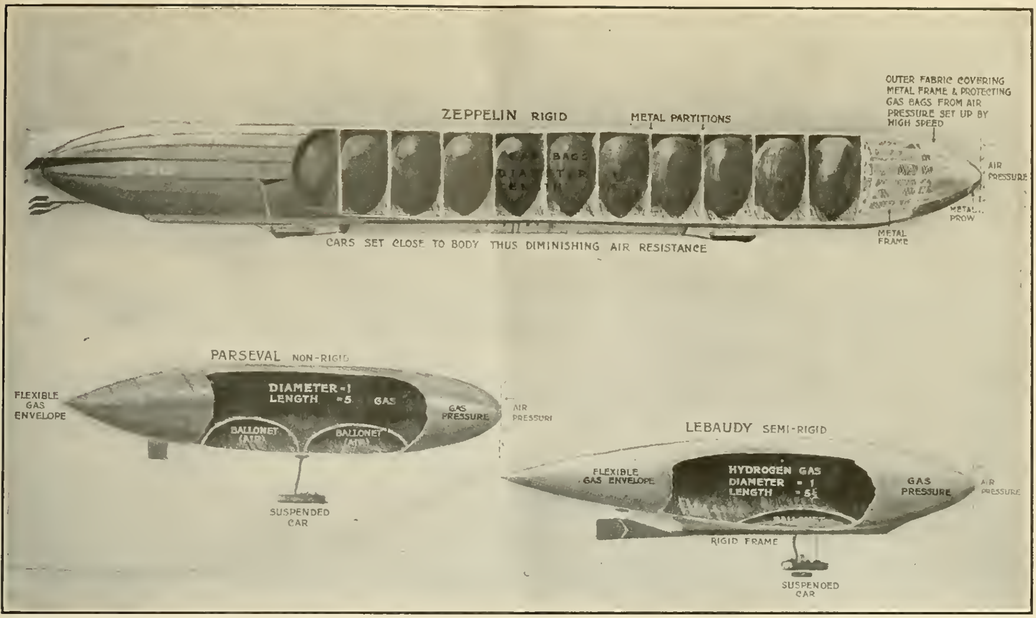

The above drawing by G. H. Davis for the London "Sphere" shows the comparison of the three types of dirigibles rigid, semi-rigid and non-rigid. All the existing airships are comprised within these three types. The Zeppelin, with its rigid framework of aluminum protecting its separate balloons and its great length, gains by having very little head resistance in comparison to its size. The long pencil-like body slips through the air with little friction. The semi-rigid type has a stiffening keel below the gas bag which serves to hold the balloon in shape. The non-rigid type is of the three the most liable to loss of gas and deformation of the envelope. The air pressure on the bow end tends to force the bag out of shape. Both these latter types are apt to set up air eddies round the cars owing to the large number of wires and other apparatus.

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AIRCRAFT

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AIRCRAFT

Vol. 4 No. 10 NEW YORK, DECEMBER, 1913 25 CENTS A COPY $2.00 A YEAR

PIONEERS OF AVIATION

By LADISLAS d'ORCY

VI. ALPHONSE PÉNAUD,

AMONG the early pioneers of the aeroplane there is none who has had a greater share in the materialization of motor flight than Alphonse Pénaud, a solitary genius, whose beneficial influence in the later development of aviation is unmistakably written on every page of its history. To this great aviator belongs also the unique distinction of having subsequently created flying machines of three different mechanical conceptions, the helicopter, the aeroplane and the ornithopter, all of which were entirely successful from the first.

A scion of an old family of sailors, that gave two admirals to the French Navy, Alphonse Pénaud was preparing to follow the career of his forefathers, when a painful hip disease forced him to leave the Naval School and directed him toward scientific studies. France was just then swept by a wave of enthusiasm in favor of the helicopter and the leaders of this movement, Nadar, Ponton d'Amécourt and de la Landelle, having discovered Pénaud's rising mechanical genius, encouraged him strongly towards the study of aeronautics. Soon Pénaud was to eclipse his masters. Following the general trend of that time, he first built a small helicopter, that remained the most successful of its kind; this apparatus consisted of two superposed screws rotating in opposite directions and was actuated by the tension of rubber strings (Fig. 1). While being very similar in its design to the helicopter that Messrs. Launoy and Bienvenu presented in 1784 to the French Academy of Sciences, the chief novelty of Pénaud's machine was constituted by the substitution of the whalebone bow by rubber strings, which were far more effective than the former and permitted flights of fifteen to twenty seconds; and on one occasion Pénaud's flying screw hovered on the same spot for twenty-six seconds, which was a much longer free sustentation, than had ever before been obtained.

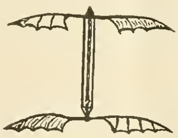


Fig. 1. Pénaud's Helicopter 1870.

Then, Pénaud turned his attention toward the aeroplane, or, as he used to call it, the "planophore," and soon he produced a little model, that embodied in itself more progress, than had been accomplished in the foregoing seventy years, and which brought forth the solution of longitudinal equilibrium, hitherto the greatest puzzle of experimenters with aeroplanes. It is true, that Stringfellow in 1846 and Louis du Temple in 1857 had built small working models of aeroplanes and had made them fly by their own power; but as a fact, the evolutions of those flying machines could hardly have been termed flights; initial velocity was gained either by a fall from a height or by a start from an inclined course, so that these manoeuvres were really but gliding flights, more or less accelerated by the power of a motor; furthermore the equilibrium in both ways was very defective and caused endless worry to the experimenters, proving a problem that was yet to be solved. Therefore when Pénaud brought out his little planophore and succeeded in making it fly horizontally, we can say, that this was the first real flight made by an aeroplane model. This machine was a monoplane; its wings were slightly tilted up at their outer ends and fixed to a central stick, twenty inches long; in the rear it carried a tail of about one-third the area of the wings, and behind it a two-bladed propeller, actuated by twisted rubber strings. The tail formed a very open angle with the wings, its angle of incidence being negative to the positive of the latter and secured thus automatically the longitudinal equilibrium, while transverse stability was obtained by the lateral curvature of the wings (Fig. 2).

On August 18, 1871, Pénaud invited his friends of the French Society of Aerial Navigation to witness the trials of his planophore in the Jardin des Tuileries, and there, having for background the still smoking ruins of the war, he launched his little apparatus. French genius was taking its first revenge. Pénaud's model, then fitted with a vertical rudder, which is not shown on Fig. 2, flew several times around in a circle to come gradually down and back to its starting point after the power of the rudder had been exhausted. The length of the flight was of about 130 feet and it was the first public demonstration of steady flight made by an aeroplane of reduced dimensions.

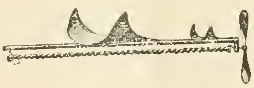


Fig. 2. Pénaud's Planophore 1871.

Hereafter the young inventor wanted also to investigate the merits of the flapping flyer and a year later he produced a small ornithopter, in which the power was furnished like in his two previous machines, by rubber strings. In this machine sustentation was obtained by straight wing strokes, whose axis of rotation was parallel to that of the flight, while propulsion was secured by the flexion of the outer wing edges (Fig. 3). This mechanical bird was just as successful as Pénaud's flying screw and his planophore; it did not rise from the ground, but by being launched off the hand it

descended some two feet, so as to gain initial velocity and then darted off to about eight or nine feet above the point of departure, flying for about fifty feet, but as Professor Marey relates it "more like an insect than a bird."

Having thus demonstrated the possibility of mechanical flight by means of three machines, each based on entirely different principles, Pénaud set himself to study the laws of the resistance of air and the mechanism of bird flight. It was in the course of this investigation that he proved the fallacy of one of Newton's laws on air resistance as applied to curved surfaces, namely, that the air resistance is proportional to the square of the sinus of the angle of incidence; he proved on the contrary, the correctness of the formula, Colonel Duchemin had given as early as 1842 and which had not been accepted by the scientific world, i. e., that the resistance is proportional to the sinus of the angle of incidence pure and simple. A firm establishment of this formula was of the greatest importance to the future development of the aeroplane; indeed, had Newton's formula been correct, birds and consequently aeroplanes had to have ten times the wing surface the former actually use for their support in the air, a state of affairs that would have rendered the construction of aeroplanes mechanically impossible. Among many other contributions of great value to aviatics, Pénaud published in the *Aéronaute* a very creditable paper, in which he explained the mystery of soaring flight by the action of ascending air currents and this theory, much decried at the time, seems to meet nowadays more and more with general favor.

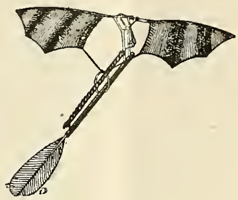


Fig. 3. Pénaud's ornithopter, 1872.

Numerous inventions, such as the guide rope break, a balloon valve, a delicate barometer, a tailless kite and a plane table for platting the course of balloons, to mention but a few, give a further proof of Pénaud's formidable activity in aeronautics; but all this did not deter him from the real and only aim he had set to himself, namely, the realization of the aeroplane, in whose ultimate success he never doubted. This faith of his was but strengthened from the day, when he discovered in London the papers of Sir George Cayley, his illustrious forerunner, whose experiments thoroughly confirmed the results of his own investigation, which led him to believe in the aeroplane as the aerial vehicle of the future.

As a materialization of the theories he had always defended so whole-heartedly, Pénaud in partnership with an ingenious mechanic, M. Paul Gauchot, took out in 1876 a patent on an aeroplane that was to carry two people and fly at a speed of sixty miles an hour. This machine was a monoplane, that embodied the characteristics of Pénaud's successful little planophore; thus the wings had tilted up ends for transverse stability and a flexible trailing edge so as to secure great efficiency; direction in both ways was obtained by a direction rudder and two combined elevator flaps. The wings were made of light framework and were covered on both sides with varnished silk; they were trussed to the body below the wings and to two short posts above them by means of wire stays. The body was spindle shaped in order to cut down the passive resistance to a minimum and was mounted on four roller legs, that could be lowered for landing and be pulled inside the body during flights. It contained a motor of 20-30 H. P., which actuated two tractor propellers; the power was to be derived from an extra light steam engine, weighing not more than fifteen to twenty pounds per horsepower. The aviator and his aide sat in the body with their heads just above the wings and were protected against the wind by a glass box; the control of the machine was united in a single lever mounted on a universal joint, that worked both the vertical and horizontal rudders by its side-to-side and fore-to-aft motion.

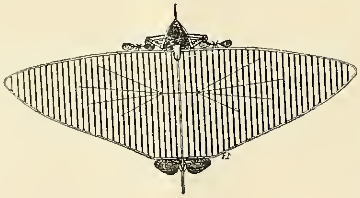


Fig. 4. Pénaud's proposed aeroplane, 1876.

Like all the early forerunners of the aeroplane, Pénaud soon realized the futility of his efforts, when he tried to find an adequate motor; and when he declared frankly, that his machine would not fly unless provided with a very light engine, even his friends and admirers turned away from him, asserting, that he never had seriously thought of effecting dynamic flight with his projected machine. Their attacks were yet surpassed by the balloonists, who saw the future of aerial navigation in the motor balloon and hailed Giffard as their chief; they ridiculed the dead born aeroplane as the creation of a lunatic and finally Pénaud, sick in body and vainly struggling to find enough strength to answer their adverse campaign, was driven to suicide at the age of 30, in October, 1880.

Thus died Alphonse Pénaud, one of the greatest pioneers of the monoplane, if not the greatest. Had he lived long enough to realize his ideas, which called for an explosion motor among others, it is probable the aeroplane would have entered its practical stage before the end of the nineteenth century and it would have been an all French invention. No man of his time and but one after him—Wilbur Wright—has had such a clear conception of the practical flying machine; no man united to such a remarkable degree inventive genius with mechanical knowledge. Most of the appliances, that are common on aeroplanes nowadays, have been either invented or improved upon by Alphonse Pénaud, to whom credit is given but very seldom; may we remind the reader of the negative angle stabilizing tail, the transverse curvature of the wings, the spindle shaped body, the single lever control, the skid-and-wheel running gear, etc.

Truly, if the monoplane has had a spiritual father, this was Alphonse Pénaud; for although Sir George Cayley had preceded the former by over half a century in establishing the elementary principles of the aeroplane and more so of the single surface machine, his work was of no avail to experimenters, owing to its disappearance from the public forum; while Pénaud conveyed such a number of sound principles to his followers, principles which are still to-day the basic laws of dynamic flight, that it became only a question of time to realize the monoplane; and this time came with the advent of the gasolene engine. It was the preliminary work of Pénaud that laid the basis of Prof. S. J. Langley's successful little machines, as this great savant acknowledged it himself on several occasions; it was Pénaud's principles that were embodied in Victor Tatain's different models, all of which flew; and at last it was again the fundamental ideas of Pénaud that enabled Blériot, Esnault-Pelterie and Levavasseur to build machines that would fly almost at their first trial under the guidance of men who never had effected any gliding flights over sand hills. And their machines were none the worse!

The more time passes by, the more Pénaud will be glorified and given his full share of credit for his unperishable pioneer work in the creation of the monoplane, which in its resemblance with the bird appeals more to the Latin imagination than the mechanical and clumsy looking biplane.

CRITICISM OF ALBERT ADAMS MERRILL'S THEORIES

By L. B. SPERRY

DURING the past Mr. Albert Adams Merrill has been advancing some theories in Aircraft regarding the longitudinal stability of converging tandem surfaces and criticising more or less our present day flying machines. His most recent articles can be found in the August number of AIRCRAFT, page 127, entitled "Stability in Flying Machines," and in the October number of AIRCRAFT, page 174, entitled "Testing the Tandem."

Now, let me ask if there are any aviators who care to fly a machine which under certain conditions would suddenly dive or climb with a tendency more powerful than his controls? If there are any who are looking for such a vehicle on which to test their powers let them choose the so-called inherently stable plane.

Mr. Merrill has conceded that the so-called inherent stability is more or less pendulous in action, resulting in undulating flight. So-called inherent stability cannot call upon a considerable righting couple without moving out of its stable zone to generate that righting couple; it cannot, therefore, return to its zone until the disturbing forces cease. In other words, a so-called inherently stable plane defeats its own purpose when in order to fight a disturbing influence it departs from its stable zone to do it. Then consider that a machine having powerful torques, which tend to make it assume certain aspects to the atmosphere, will be most dangerous on rough days. When this machine enters an up or down trend it will try to bring about the same relation to that up or down trend that it formerly had in a quiet atmosphere. The aviator will then have to fight to keep the machine from diving or climbing.

Now let us compare the aeroplane with a ship. It is true that the longitudinal stability of a ship working in two fluids, as it does, is not analogous to the longitudinal stability of an aeroplane. In lateral stability it is akin, since lateral tip does not increase the lift of either, but decreases it. We find as Naval Architecture has advanced in seeking sea-worthiness that the righting couple has been tremendously reduced. The "Imperator," for instance, has a meter-centric height of about the length of a 16-inch slide rule. Now, if powerful righting couples are the vogue for ships, then a raft would be the boat on which to fight rough seas, and we would wish to discard the present type of aeroplane.

We have it from an eye-witness of the so-called lateral inherently stable Fokker machine that to him it did not fly, but fluttered constantly, tipping from one side to the other. At times it tipped to large angles, and what amazed him was that it did not go all the way over. From the foregoing we feel justified in describing such a machine as inherently cranky instead of inherently stable.

So-called inherent stability is not a new thing; on the other hand, very old. Langley, Lillienthal, Montgomery, all worked on this theory for stability. One of the first Bleriot machines was a following plane type, copied from Langley. In 1905 John J. Montgomery of Santa Clara, Cal., filed a patent for his inherent stable plane which caused his death when he evidently was unable to straighten it out from a nose dive. That that type is not the present type is only another indication of the fallacy of a large righting couple.

My experience has led me to believe that present day machines have more righting couple already than is necessary. So much for so-called inherent stability.

The sum and substance of Mr. Merrill's articles is that present machines have certain defects in design which makes them unsafe. He suggests remedies for these defects and concludes by saying that before aviation is placed upon a firm foundation a correct theory of design must be worked out by laboratory research.

He claims that present machines are so badly designed that dangerous couples are introduced which have to be offset by other couples introduced by the pilot. That we fly as well as we do is not due to design of the machine but to the skill of the pilot and that it is possible to design a machine in which the couples introduced are righting couples and in which no offsetting couples are needed. He further claims that until such a machine is produced there will be only a small market for the sale of flying machines.

All save one minor defect in "present machines" do not exist in a correctly designed machine, as, for instance, the Curtiss flying boat. I have no connection in any way with the Curtiss Company, but I am naming the machine because it is the one with which I am familiar.

The first defect is his argument in quoting him as follows: "These rotations have a great influence upon safety in flight, not only because they throw the machine away from a safe horizontal position, but particularly because they affect the speed of the machine upon which the control depends. Of the two, a stalling rotation is the more dangerous for two reasons: (a) because the pressure angle is increased, which increases the resistance, and unless the thrust of the screw is increased proportionally the speed is decreased. This is always dangerous and many accidents have been due to stalling. (b) If the angular velocity of a stalling rotation is high, there will be a rapid increase of pressure per square foot on the supporting surface, and this sudden strain may cause the machine to collapse. Several deaths have been due to this cause."

Reason (a). We will grant that the theory is correct, although I do not know of any one experiencing difficulty along this line.

Reason (b). That if the angular rotation is too high it may cause the collapsing of the machine is ridiculous. Imagine a machine to be dived vertically so as to attain a maximum velocity of 125 miles per hour (Beachey timed on a vertical dive). The machine to then be given the angle at which it will give the maximum lift, this total lift on a 2,000-lb. flying boat will be 6.7 times the normal lift. This is a rough estimate of the maximum stress that can be possibly exerted upon a machine. Dr. Zahm allowed a safety factor of 10 or 12 on the Curtiss flying boat. Mind you that in normal flying one never reaches beyond 70 or 75 miles per hour. I can, of course, get the necessary co-efficient from Eiffel which would allow me to calculate the stress within a small percentage.

Next: "Too rapid a diving rotation has caused the downward collapse of machines and the deaths of some aviators." This stress has been considered in a similar manner by Dr. Zahm in the design of the Curtiss flying boat.

Merrill does not consider the pressure brought to play on the tail surfaces, when the machine's angle is changed from 5 degrees to 8 degrees. The stability couple produced by the shifting of the center of pressure is very small compared with the stability one caused by pressure on the tail planes. Eiffel's graphs show that a change of angle of from 5 degrees to 8 degrees shifts the pressure 2½ per cent forward, which means a moment of one-eighth of a foot on a machine having a 5-foot chord. The anti-couple would therefore be on this 2,000-lb. machine 250 lbs. feet. Now let us consider the stability couple. The 50 square feet of tail area having an angle of 3 degrees, will give us, according to Eiffel, 144 lbs. lift, acting at a distance of 14 1-5 feet. The stability couple is therefore equal to 2,045 lbs. feet, minus 250 lbs. feet, the anti-couple produced by the centre of pressure shift leaves 1,795 lbs. feet stability force.

(*Continued on page 231.*)

EDITORIAL

THE SITUATION.

JUST recently a representative of the Curtiss Aeroplane Company came to New York and spent several weeks paying visits to a hundred or more prospective buyers of flying boats located in this vicinity, most of whom, by the way, are regular subscribers of Aircraft. These prospective buyers of flying boats are mostly rich men who can afford to spend from five to ten thousand dollars for air machines, and they are all men who will take it up for sporting or useful purposes. Some will use it to commute from their country homes to their city business places, while others will use it for the fun of speeding along on the water and over the water at a greater velocity than they can attain with other speed boats, and also with a far greater degree of safety and comfort as well.

These men will purchase these boats, not for the purpose of breaking altitude records or doing somersaults in the air, but just to enjoy the indescribable pleasure of shooting along on a cushion of air at a moderate height from the water.

There is no doubt that some of these prospective purchasers will be landed by the Curtiss representative immediately and a large number of them within the next year, for Aircraft has been educating them up to the purchasing point for several years, and they are just about ready to materialize as active participants in the development of the aeronautical movement.

According to the statement made by the Curtiss representative, the Curtiss Aeroplane Company is already 40 orders ahead in flying boats, which is, we must say, very encouraging news to give out.

We also understand that the Curtiss Company is about to enlarge its plant to a considerable extent, which all goes to prove that the Curtiss Company has great faith in the future of the aeronautical industry.

Now, what we would like to impress upon our readers, and also upon the manufacturers of aeroplanes in this country the most, is this fact: that what Curtiss has already done and is doing now is not even a fly bite to what Curtiss and many other companies will do in the future. Curtiss and all the aeroplane manufacturers in the world to-day put together have but given a slight scratch to the surface of the aeronautical industry. Where the Curtiss Company has 40 orders ahead to-day, in two or three years from now it will have 400 orders ahead, and where there is one company that is doing what Curtiss is doing to-day there will be 50 companies doing as much or more within five or ten years from now, and it is not in the least unreasonable to make such a statement when one stops to consider the great possibilities of the flying boat alone and the flying boat, by the way, is only one little mite of the aircraft industry.

The rising generation will no more think of plodding along on the water with a motor boat or a steamboat at the rate of from 10 to 50 miles an hour when they will be able to use an airboat for the same purposes and travel at the rate of from 60 to 200 miles an hour any more than the present generation would plod along in slow-going horse-drawn vehicles when they can use the speedy automobile, fast electric railways or railroads for transportation purposes.

We dwell more largely upon the flying boat because its usefulness is more apparent at the present time, and in fact it might be stated that the useful qualities of the flying boat is already becoming recognized by the great majority of people everywhere, and therefore a market for the sale of flying boats is already here and all that is needed is for 40 or 50 large manufacturing plants to be established for the purpose of following in Curtiss' footsteps and introducing these boats directly to the people through personal representatives, and in demonstrating them to the people by careful and skillful pilots, and by using the same methods as the promoters and builders of the automobile and motorboat industries had to do in order to accomplish lasting results.

There is absolutely no limit to the possibilities and development of the flying boat, and with sufficient capital introduced in the different manufacturing plants for experimenting and demonstrating purposes the results to be attained in the future both in mechanical development and financial returns should be far beyond anything that the present mind of man is capable of conceiving.

The great thing needed at the present time is capital, and those men who are endeavoring to build up the aeronautical movement should not only lend encouragement by putting in their own capital, but should endeavor to enlist through educational channels large capital from outside the breastworks of the movement. Once the men of wealth or the investing public generally realize the possibilities of the aircraft industry as a commercial thing or a money-making proposition, there is no limit to the money that will be produced for its development.

The advance orders which the Curtiss Company have at the present time and the fact that it becomes

necessary to enlarge their plant and increase their working forces to take care of the business, is one of the greatest arguments that all other manufacturers could use to enlist new capital in their own companies. Curtiss is proving by progressive methods that the market is here, and there is no reason why all other manufacturers cannot do the same thing by either adopting the Curtiss methods or introducing original methods of their own. The secret of Curtiss' success is that he goes out and hunts up the customers even if he has to go to the other end of the world to find them, and that is why the Curtiss boats are being purchased by the Russian, German, French, English and South American governments. Curtiss goes to them; he does not wait for them to come to him. Curtiss believes in his product and he spends money to market it, always making the purchaser, of course, pay for the cost of selling it to him. Manufacturers should not forget that point and put the prices of their machines at a high enough figure to cover the cost of advertising it and selling it as well as the cost of merely building it.

Men who buy flying boats at the present time for sporting purposes can afford to pay $6,000 as well as they can afford to pay $3,000 for them, and the manufacturer who will succeed must make his price high enough so that first-class agents, salesmen and demonstrators can be liberally rewarded for the part they take in the sale of the product.

At the very lowest estimate we believe there will be a sale for 200 flying boats in the United States during the coming year, but if the manufacturers would take hold of the thing in the right way this number could be increased to 400 sales or more, but the American manufacturer should not be content with the American trade alone, for there is an unlimited field for the sale of these machines throughout Europe, Asia, Africa and especially South America.

Now is the time to get busy. Spring will soon be here, and the results of this year's flying boat demonstrations will produce early buyers so that all of the manufacturers should use their utmost efforts to secure a fair share of the business which is bound to come.

Transportation by the air route is just as sure to come in the future on a large scale as the sun will continue to rise and set daily. The aeroplane of to-day is but the forerunner of larger, safer and more useful air vehicles which will be the result of a gradual evolution in the construction and operation of these craft. After more than five years of indefatigable service given to the aeronautical movement we are more favorably impressed with the possibilities of its future than ever before, and feel that the budding industry is just about ready to bloom forth in all its splendor and glory, so that from now on we should look forward with considerable enthusiasm for some extraordinary developments.

ACCIDENTS.

One of the New York papers recently published a news item stating that a boy was killed by an automobile, and further mentioned that this boy was the 240th victim of the automobile in New York City during the year of 1913.

That seems to be quite a large number of killings for a period of ten months in one city alone, and if the whole number of victims killed by the automobile throughout the world could be listed the number would be simply appalling. But the fact of the matter is that the automobile has now become a generally accepted means of transportation, and likewise the killings have become so numerous that they are only given publicity when happening right in under our very noses. Statistics show that over 100,000 people are killed on the railroads alone in America every year, and steamboat fatalities are of such frequent occurrence and so many lives are lost at each catastrophe that it is hard to keep pace with the number of people who lose their lives traveling over the water.

And notwithstanding the tremendous death rate caused by the railroads, automobiles and steamboats all over the world continuously, still, whenever one man loses his life in aviation a cry of horror goes up as though flying was the only cause of deaths.

The fact of the matter is that there are so few people killed in flying that it attracts attention. When the time comes that the movement is developed to such a large extent that there will be as many people killed while traveling through the air as there are now killed while traveling over land and over water, there will be no more notice taken of it than there is in a man being killed by a railroad train or automobile at the present time.

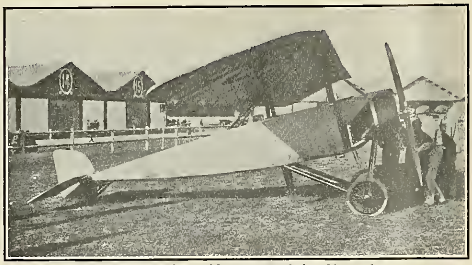
All this talk of perfecting the flying machine to a point where there will be no danger of accident is just as ridiculous as if we talked of perfecting the railroad and steamboat and automobile to the point where there would be no accidents.

Accidents to the human being always was, is now, and always will be; that is part of life itself. The human being takes a chance on his life every minute that he lives, and he is just as likely to meet with a fatal accident whether he is riding in an aeroplane or automobile, or steamboat, or railroad train, or trolley car, or whether he is just walking or running about, or merely eating some of the poisonous food which in one shape or another is served to the people as a whole through the complexity of our economic system.

Nature has a way of teaching us through accidents how to do things with more care and method, and it practically requires an accident in order to make improvement. Just as the child learns that the fire is hot by being burnt and therefore becomes more careful toward fire, so the builders of the aeronautical industry will become more careful in their work of the future after each accident occurs. But there will always be accidents, no matter what state of perfection may be attained; that you can depend upon.

* * *

Gradually the tried and true aeroplane manufacturers and accessories concerns are forging to the front and are showing unmistakable signs of prosperity and permanency, while at the same time the "fly-by-night" variety are passing to that beautiful shore from whence they never return. Truly it is a case of the survival of the fittest in the aeronautic industry as well as any other field, and the advertising columns of Aircraft is a most reliable thermometer to be guided by when looking for those that are the fittest.



A new type of the Morane-Saulnier Monoplane driven by Garros.

Foreign News

BY

Arthur V. Prescott

Austria

The governments of Austria and Russia, following the action of Great Britain and Germany, have issued orders prohibiting flying over certain areas. Flying in Russia is prohibited over the region between 23 deg. and 25 min. of longitude east and 50 deg. 10 min. and 60 deg. 10 min. latitude north, which takes in the Russian ports on the Baltic Sea.

In Austria the prohibited areas are in Galicia, the Tyrol and Dalmatia.

Belgium

The Belgian Army has now 33 officer aviators and 92 rank and file, not one of the latter being trained as pilots. So far, $300,000 has been spent on the military corps. The army possesses 24 H. Farman biplanes, built under license by the Bollekens firm at Antwerp.

Chile

The Chilean aviator, Figueroa, using an old Bleriot monoplane, recently flew from Antofaasta to La Pampa, a distance of 340 kiloms (211 miles), which is a record for Chile. In making the return flight the pilot was forced to make a hurried descent and landing hard the chassis gave way and the tank broke, setting fire to the monoplane. Fortunately the pilot was unharmed. Figueroa, however, now has one of the latest type Bleriots on which he intends to try to fly across the Andes.

Denmark

Raould Amundsen, according to a dispatch, will leave Norway for New York early next spring en route for San Francisco, where he and two other members of the 1914 North Pole Expedition will learn to pilot American flying machines, two large hydro-aeroplanes being part of the expedition equipment. The start from San Francisco for the North Pole is planned for June, 1914.

England

On returning from his visit here to the States, Mr. Glenn H. Curtiss left the sole agency for the Curtiss flying boats and engines in the hands of Capt. Ernest C. Bass, who will be assisted by Lieut. J. C. Porte, late R. N. Brighton is favored as a locality for headquarters, from which coast town Lieut. Porte and Capt. Bass, alternately piloting the Curtiss boat, will cruise along the south and east coast, as far as the Thames, to demonstrate the qualities of the craft and the reliability of the engine.

A great deal of flying has been done recently on the Curtiss boat at Brighton, eight passengers being given their first taste of this mode of transportation by Mr. Cooper, the pilot, in one day. In three days, some twenty flights were made, always with a passenger, and it speaks well for the skill of the pilot, the construction of the craft and its reliable motor that not a mishap or missfire in the engine occurred. The Deperdussin control is to be fitted in place of the American shoulder-strap control, and it is understood a 160 h. p. engine will replace the present one.

ASTRA-TORRES DIRIGIBLE MAKES SPEED RECORD

The English Naval dirigible "Astra-Torres" recently made a world's record for speed during some trials at Farnsborough. Going with and against a twelve-mile wind, this French built craft attained an average speed of 51 miles an hour.

FLYING PROHIBITED OVER GIBRALTAR.

An ordinance has been published, making it an offense for any person to navigate air craft over any portion of Gibraltar, except in the service of the King. Officers have authority to fire at any air craft which may not ooey their signals.

The "Eta," the last of the series of small experimental airships built at the royal aircraft factory, is now undergoing tests. The ship is a modified Parseval in type. The capacity is 100,000 cubic feet. There are two radial stationary 160 horsepower engines set on opposite sides of the car with their axes placed transversely. As in the Parseval airships, swiveling propellers are used. During one of her trial flights, the "Eta" went to the assistance of naval airship No. 2, which had broken down. The novel experiment of towing the disabled airship was made. A difference in level of about 600 feet was maintained in order to avoid all chances of fouling the rudder gear.

ENGLISH AERO SHOW IN MARCH 1914

It is announced that the combined aero, motorboat and engine show to be held at Olympia Hall, London, next Spring, will take place March 10-21. Considerable interest is being manifested by the aeronautic contingent and most of the British manufacturers will exhibit.

"DAILY MAIL" ROUND BRITAIN RACE TO BE HELD AUGUST, 1914.

The next running of the "Daily Mail" $25,000 waterplane race around Britain is scheduled for next August. The competitions committee of the Royal Aero Club of Great Britain is now at work on the regulations which will probably be quite a bit changed from those in force in the recent event.

ENGLAND ADOPTS LEWIS AEROPLANE RIFLE

Great Britain at last has acquired what the War Office considers the ideal aeroplane gun. It is none other than the latest model of the air cooled gas operated Lewis rifle, already experimented with by the United States army, and is to be made a weapon of offense for aeroplanes in the British service.

Attention of the ordnance experts was first attracted to the Lewis gun about two years ago. The aeroplane gun invented by Col. Isaac N. Lewis was first successfully tested at College Park, Md., in April, 1912. From the simple experiment of seeing one officer pour service rifle bullets into targets while traveling fifty miles an hour aeroplane strategists foresee that armed forces below will be at their mercy. The effectiveness of the fire reminded one of a gardener playing a hose on a flower bed.

The gun weighs only fifty pounds and shoots 750 shots a minute, with no recoil or flame. The gun has an automatic cooling device whereby the barrel is kept continually cool by a blast of air, and after a certain temperature is reached increased rapidity of fire tends to reduce the temperature.

France

STABILITY TESTS WITH A FARMAN

Some noteworthy tests were carried out at Etampes on October 15 on an ordinary Farman.

Rougerie, who is in charge of the Farman school at Etampes, descended from 550 metres, *absolutely vertical* but with the machine remaining horizontal as if in an ordinary flight, and with the motor stopped, without the machine oscillating in any way. Gougenheim, with an officer as passenger, later carried out a similar maneuver, which should prove useful when bombdropping.

A feat which secures the Criterium of the Aero Club of France was accomplished by Augustin Leguin on October 13th, when he surpassed all his former fine flights by flying a Henry Farman biplane from Buc to Bordeaux and back, a distance of 646 miles, without making a descent.

The French National Subscription Fund for Military Aviation shows a total amount raised of 6,114,856 francs ($1,220,000). The money is being applied to training of pilots, establishing flying stations in various parts of the country, in encouraging invention, and for increasing security of machines in the air, while 198 machines have already been purchased.

CHEVILLARD LOOPS THE LOOP IN BIPLANE

The practice of flying upside down is becoming an obsession among flyers, several having made demonstrations on various types of aeroplanes since Pegoud set the precedent on a monoplane.

On November 7, at Buc, Maurice Chevillard in a light-weight Farman biplane gave a wonderful performance in a gale, doing all kinds of stunts, including flying his machine upside down, making spirals, and looping the loop. On November 18, Chevillard looped the loop at Buc with a passenger.

Capt. Gerard of the Crotoy aviation center recently completed an excellent aerial tour, totaling 654 miles. In a fortnight he flew the following stages, each without intermediate descents: Le Crotoy-Etampes, 136 miles; Etampes-Troyes, 99 miles; Troyes-Nancy, 100 miles; Nancy-Longwy, 74 miles; Longwy-Verdun, 40 miles, Verdun-Reims, 75 miles; Reims-Le Crotoy, 130 miles.

Several Breguet and Caudron hydro-biplanes have been ordered by the Minister of Marine as a result of the demonstration and splendid performances of these machines at the recent Deauville Meet.

An interesting exercise was carried out at Frejus (Var) on October 22 by a submarine—the "Argonaut"—and several naval seaplanes. The submarine, attended by the gunboat "Etau" and two torpedo boats started out on the bay at 6 A. M. An hour later the seaplanes took to the air, making flight of about 20 miles over the bay and successfully detecting the position of the "Argonaut," which was submerged at a depth of eight fathoms (28 feet).

Ladislas d'Orcy, author of a series of articles appearing in AIRCRAFT under the caption of "Pioneers of Aviation" and a historical aeronautical writer of note, announces the publication at an early date (Aeronautic Librairie, France) of a book written by himself and R. Desmons entitled "'Theorie et Pratique del' Hydravion." This work deals with the history and technique of the waterplane.

STABILITY TESTS WITH FARMANS CHEVILLARD, GOUGENHEIM AND ROUGERIE ACCOMPLISH AMAZING FEATS

We learn that Henry and Maurice Farman have carried out some noteworthy tests during the past month with standard Farman biplanes. Rougerie, who is in charge of the Farman school at Etampes descended from 550 metres absolutely vertical but with the machine remaining horizontal as if in ordinary flight, and with the motor stopped. Gougenheim, with an officer as passenger, later carried out a similar maneuver which should prove useful for making detailed observations, bomb dropping, etc.

FLIES 161 1/2 MILES AN HOUR

Emile Vedrines, who finished second in the recent International Aviation Race, on September 16th, attained the pheuomenal speed of 161.46 miles per hour, when he flew on his Ponnier monoplane from Mourmelon to Reims in six minutes with a strong wind at his back.

A JOY RIDE FOR GARROS

On his Rhone-Morane, Gilbert, on October 23, took Garros from Villacoublay to Chevilly, where the latter's machine had been left. Later the two aviators returned in company to Paris, each flying his own machine.

GILBERT FLIES ROUND PARIS

On his Deperdussin monocoque, which has a 160 h. p. Rhone motor and Chauviere propeller, Gilbert succeeded in flying round Paris and win-

ning first place in the competition for the Deutsch prize, which closed on the 31st of October. Setting out from Villacoublay, he passed over the official starting place at St. Germain-en-Laye, and passing over Senlis, Meaux and Melun, he returned over St. Germain, his time for the circuit of 200 kiloms. being 1 h. 13 m. 25 2-5 s., so that his average speed was 163.450 k. p. h.

CHEVILLARD'S SCANDINAVIAN TOUR

One of the best series of prearranged flights which have been made was that completed by Chevillard in his tour of Denmark, Norway and Sweden. The task Chevillard set himself was to fly for three weeks, covering nearly 2,000 miles, and giving over 30 hours of exhibition flights, which meant a flight or exhibition nearly every day. This, in a country cut up by lakes, woods and mountains, often necessitated a flight of over 60 miles without the possibility of landing—no mean performance. Moreover, it was decreed that the flight should take place under military conditions, that is to say, that he should carry a passenger, who in this case was Capt. Sundstet. Further, that he should carry petrol for four hours' flying and certain spare parts; and added to this were two heavy cases, the total weight being equal to about 600 lbs.

Leaving Copenhagen on September 14th, Chevillard carried out his programme day by day without the slightest accident or delay, and the weather was anything but favorable. He had continually to travel through thick fogs, flying entirely by the compass often at a height of 6,000 ft., in order to clear the mountains.

A PARACHUTE FOR AEROPLANES.

Another parachute, designed as a safety device for aeroplane pilots, has been demonstrated in Paris. The parachute, which is the invention of MM. Fons Godial and St. Martin, was arranged on a monoplane *fuselage*, in the seat of which was a dummy to represent the pilot. The *fuselage* was then launched from the first platform of the Eiffel Tower, and the parachute opening out carried the dummy down gently, while the *fuselage* crashed to the ground. The parachute has ribs similar to an umbrella. It is stated that a Russian pilot, Davricheny, will shortly make practical experiments with the parachute from his biplane.

GARROS LOOPS THE LOOP.

At Villacoublay on November 19th, Roland G. Garros succeeded in making several loops in a monoplane. Five types of machines have now been demonstrated as capable of flying upside down—three monoplanes and two biplanes.

Germany

FLIES FROM BERLIN TO COPENHAGEN.

Starting from the Johannisthal aerodrome, Berlin, at 8.33, on the morning of October 12th, Herr Reiterer on an Etrich monoplane, with Capt. Neumann as passenger, flew to Copenhagen, making a non-stop trip and completing the 370 kiloms. in 4 hours, 12 minutes.

ANOTHER LONG GERMAN FLIGHT.

Starting from Gotha very early on the morning of the 21st of October, Schlegel on an Etrich monoplane, flew with a passenger to Mulhausen and back, a distance of about 550 kiloms., arriving back at Gotha at 6 a. m. His next stage was to Johannisthal, and from there to Koenigsburg. He then started for St. Petersburg, but lost his way over the Baltic Sea in the mist, and eventually came down at Labian. Unfortunately he made a bad landing, and the machine turned over. The pilot injured his nose, while the passenger escaped wih severe bruises. In the 19 hours from the commencement of his flight, Schlegel covered 1,470 kiloms.

PEGOUD AT BERLIN.

When Pegoud flew at Johannisthal, the performance served to attract to the aerodrome the largest crowd, about 100,000, which has yet been seen there. Among those present were the Grand Duke of Mecklenburg Schwerin, Prince Frederick Leopold of Prussia, Prince Frederick of Mecklenburg and Prince Henry XXXII of Reuss, as well as the Minister of War and several principal Army and Navy officers. The Zeppelin liner "Hansa" cruised over the aeodrome while Pegoud was making one of his flights. During one performance, one loop was made at a distance of less than 60 metres from the ground.

The German Army is acquiring its second Schuette Lanz airship which will be known as L. IV. This new vessel is designed by Prof. Schuette and is now nearing completion at Mannheim. The new airship contains 847,000 cubic feet of gas. It has five cars, one for the commander in front and four for the crew. Two of these four cars are loosely suspended in the center line fore and aft, and the two others are fixed rigidly in the middle on each side of the center line. Four motors, three Maybach and one Daimler, drive the airship. Two propellers are connected with each motor. The speed of the vessel is estimated at 45 miles an hour.

Greece

The Minister of Marine has ordered three Sopwith biplanes of special type for instructional purposes in the Greek Navy.

In perfecting the military airship Germany is at the same time assuring the future of passenger air travel upon a vast scale. More than 20,000 passengers have already made excursions in Zeppelins, comfortably quartered and sumptuously catered to, as shown above.

Holland

Leo Van Steyn, accompanied by Lieut. Hopslee, on his Henry Farman biplane succeeded in improving on the Dutch height record for pilot and passenger, going up to 1,950 metres in 52 minutes.

Italy

A pamphlet has been issued from the Italian War Office stating that a course of study will be opened for 50 non-commissioned aviators at Turin in December which will comprise theoretical work and practical instruction at the military aerodromes.

A waterplane escadrille and school will shortly be gotten into shape as a department of the Ministry of War on Lake Maggiore.

The Navy has bought a Henry Farman seaplane as a result of this type, installed with a 80 H. P. motor, having gained second place in the Italian Lakes hydro-aeroplane meeting against machines having double that horse power.

Russia

COOPER COMPLETES RUSSIAN TRIALS.

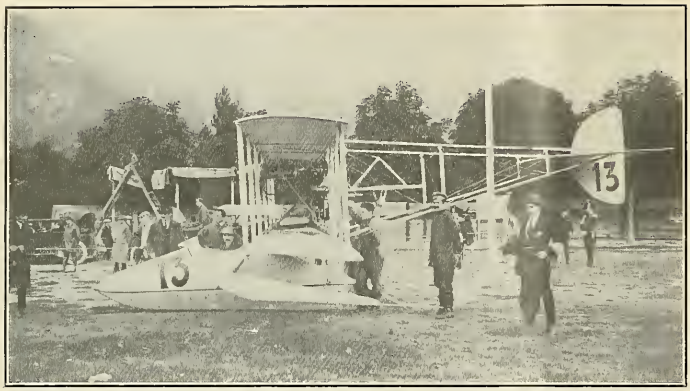
Mr. John D. Cooper, the Curtiss aviator, has completed the demonstration of a recent shipment of American water-flying machines for the Imperial Russian Navy. The trials were perfectly successful, all the machines being approved and accepted by the government within two weeks after their arrival there.

Curtiss flying boats and hydroaeroplanes now form the largest part of the aerial equipment of the naval aviation corps, some sixteen machines having been accepted during the past year, with others under course of construction in America, and arrangements about completed for the establishment of a branch factory in St. Petersburg. Extensive experiments were made during the year with hydroaeroplanes turned out by leading European builders, but none of these proved as satisfactory as the American machines.

Among the machines accepted was one of the latest type Curtiss flying boats. Carrying a passenger weighing 180 pounds, 34 gallons of gasoline, and 4 gallons of oil, Cooper attained an altitude of 1,000 feet in 3 minutes. Some skepticism prevailed among the officers, before the trial, as to the ability of the machine to make the climb, and their first interest when Cooper alighted was to examine the barograph record.

Glenn H. Curtiss was present, in fact made the first flights with the new boat. He carried as passengers, Count A. A. Muruzi, Colonel of the Army Aviation Corps; and Lieut. Staowyski, Commanding Officer of the Naval Aviation Corps, both of whom expressed great admiration for the machine. Lieut. Victor Utgoff accompanied Cooper on the trials. He is an expert operator of the Curtiss hydroaeroplane, but became an

Descending the gangplank. The collapsible gangway of a Zeppelin is raised by wires until it becomes the closed door to the cabin.



The above is a reproduction of Enea Bossi's flying boat, which is the first of this type of machine to be built in Italy. Note the short hull set far forward and an outrigger variety of tail which type is now being built to some extent both in England and America. In fact, it is this type of machine which the Wright Company have recently demonstrated so successfully on the Miami River near Dayton, Ohio.

immediate enthusiast for the flying boat, the control of which he mastered in a few lessons.

During his stay of three weeks Cooper instructed Lieut. H. N. Lutshanihoff, Lieut. N. L. Michylow, Lieut. I. I. Stacowski, and Lieut. N. R. Veran.

It is interesting to learn that the Russian army has about 120 machines at the new aviation centre about 15 miles from Sebastopol, and that about 75 per cent of these are in excellent flying order. The naval flying corps at Sebastopol has altogether about 25 machines, practically all in good condition.

THE RUSSIAN MILITARY TRIALS.

The official awards in the Russian military trials give the first prize of 25,000 roubles to the Sikorsky biplane, with 80 h. p. Gnome motor, piloted by Aleknowitch, the second prize of 15,000 roubles to the Sikorsky monoplane, with 100 h. p. Gnome motor, piloted by Jankowsky, the third prize of 10,000 roubles to the Deperdussin, with 80 h. p. Gnome, piloted by Janoir, and the fourth prize of 5,000 roubles to the Morane-Saulnier, with 80 h. p. Gnome, piloted by Audemars. These were the only competitors of the 11 entrants to qualify. In the list of marks the Sikorsky biplane was first with 31.39 points, the Deperdussin second with 30.50 points, the Morane third with 29.09 points, and the Sikorsky monoplane last with 28.05 points. Foreign competitors had a handicap of a 10 per cent reduction of marks, and that accounts for the Sikorsky monoplane obtaining the second prize.

Sweden

FARMAN HYDRO FOR SWEDEN.

On October 16th at Boulogne, in the presence of several Swedish officers, Chevilliard carried out some tests with a Henry Farman hydroaeroplane purchased by the Swedish Navy. With a passenger the machine climbed 720 metres in 14 minutes, and in the speed test it was timed to do 92 kiloms an hour.

Spain

After flying at Baza and Lorca, Lucien Demazel on his Bleriot, accompanied by his father as passenger, flew to Cartagena and piloted his machine over the train in which the King of Spain and the French President were traveling. Later Demazel flew over the French and Spanish fleets and in the evening the aviators were received by the King and President on board the cruiser "Diderot."

NEW RECORDS PASSED.

At a meeting of the Commission Sportive Aeronautique official recognition was accorded to the record of 6 h. 42 m. 49 3-5 s. for pilot and passenger made in a closed circuit at Deauville by Gaubert on Aug. 30th. They also passed Prevost's speed records which were made at Rheims on Sept. 27th, together with the records which superseded them on Sept. 29th. The latter are from 10 to 200 kiloms. and from ¼ to 2 hours.

BRINDEJONC SECURES POMMERY CUP.

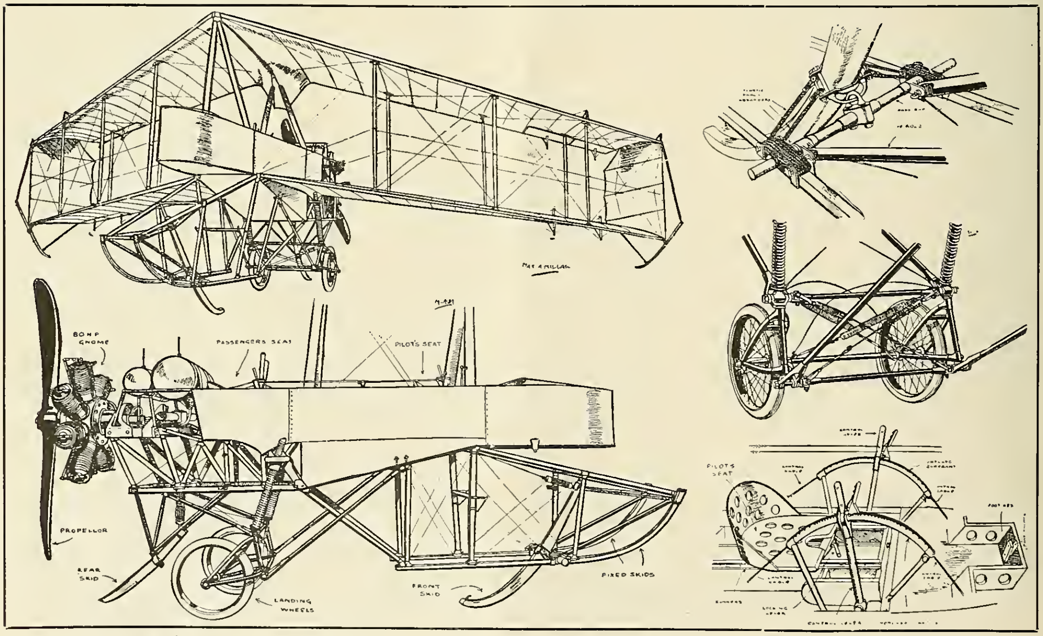
The C. S. A. also decided that Brindejonc des Moulinais was the winner of the Pommery Cup by his flight on a Morane-Saulnier monoplane from Villacoublay to Warsaw, 1,382 kiloms.

MME. PALLIER'S FINE FLIGHT.

By her flight of 290 kiloms. in 3 hrs. 40 mins., on an Astra-Nieuport biplane, at Mourmelon, Mme. Pallier has secured first place in the competition for the Coupe Femina, having beaten Mdlle. Dutrieu's record of 254.130 kiloms. Mme. Pallier made 29 circuits of the 10 kilom. course, but there appears to be some doubt as to whether the first lap will count, as the official timekeeper was not present at the start.

GUILLAUX SUSPENDED FOR TEN YEARS.

At a fully attended meeting of the Commission Sportive Aeronautique, the case of the mistake which arose in connection with Guillaux's last flight for the Coupe Pommery was considered at length. Guillaux took full responsibility for the error and expressed his regret. It was eventually decided that he should be suspended for ten years.



A three-quarter view of the Dunne biplane in which attention is called to the peculiar "shoot" in the top plane over the engine. In the lower drawing of the nacelle and chassis, considerable detail is shown. The small drawings to the right show the details of the front skid, the chassis and the control arrangements. Further particulars concerning the Dunne machine can be found on pages 156 and 157, September, 1913, AIRCRAFT.

MODEL DEPARTMENT

By NICHOLAS S. SCHLOEDER

THE FALLACY OF PARALLEL GEARING

It seems strange in these late days when knowledge of the elementary laws of nature is so universal when the beliefs in perpetual motion are numbered only among the unenlightened that the ideal of parallel gearing for the purpose of increasing the number of turns should have become so sadly imbedded in the minds of model flyers. The accompanying diagram illustrates what is meant by parallel gearing. Briefly a series of rubber motors, usually two or three, are made to work in unison by means of gearing in driving a single propeller which is attached to the extended shaft of one of the gears.

Not only have modelists built great numbers of machines employing this scheme but text-book writers almost without exception have in the past devoted much space in their books on models in elucidating the advantages and disadvantages of this arrangement. At one time it

Parallel Gearing

was believed that the advantages were so great that geared machines were in the majority. Gradually model flyers saw, judging from results obtained in actual flight, the advantages were not nearly so obvious as seemed to be the case from a theoretical standpoint. The reason for this they attributed to losses due to friction, to imperfection in the construction of the gears, and to added weight. As records were being made by machines not geared, model flyers ceased to employ this type so that it has now fallen into comparative disuse. Enough of them remain, however, to warrant this article, especially in scale models.

The theory that led to the use of parallel gearing was something like this. In a rather general way it was known that fewer strands of rubber in a motor of given length meant more turns. Thus the idea suggested itself of dividing the rubber in two or more parts, uniting them again by means of gears whereby not only would the number of turns obtainable be greatly increased, but this could be done without any loss in torque, the consideration of friction being eliminated. The law of the conservation of energy which made this result utterly impossible did not seem to enter their minds. While the total amount of energy which is transmitted to the propellers is the same in both cases the rate of transmission is different. The gearing increasing as it does the number of turns obtainable means that so much more time is consumed in unwinding. To assume that anything else would happen leads to an absurdity, for in that case it would be necessary to hold that no increase in energy would be required to overcome resistance in the same time through a greater distance; or as it might be put, to hold that to shove back the greater quantity of air in the same time, harder work would not have to be done. In other words one would have to believe that greater energy was delivered to the propellers than was originally stored in the rubber.

Perhaps it would be well here to state the laws showing exactly the effect produced in a motor of given length by different number of strands. These laws were first demonstrated experimentally by the British engineers, Messrs. Rider & Hitchens of Liverpool. They found that other things being equal (1) the revolutions obtainable from a given rubber motor is inversely proportional to the square root of the number of strands, and (2) the torque varies directly as the cube of the square root of the number of strands. Thus if the number of strands in a motor of given length be increased from 4 to 16 than according to (1) just twice as many revolutions may then be obtained and (2) the torque will be eight times as great. Applying these rules to a geared motor, say of four strands, it will be found that torque and revolutions will come out equal according to the physical laws. Thus it will be seen that not only is there no advantage to be derived from this arrangement, but because of added weight and friction actual loss invariably results. The only effect is to slightly reduce the length of the motor base.

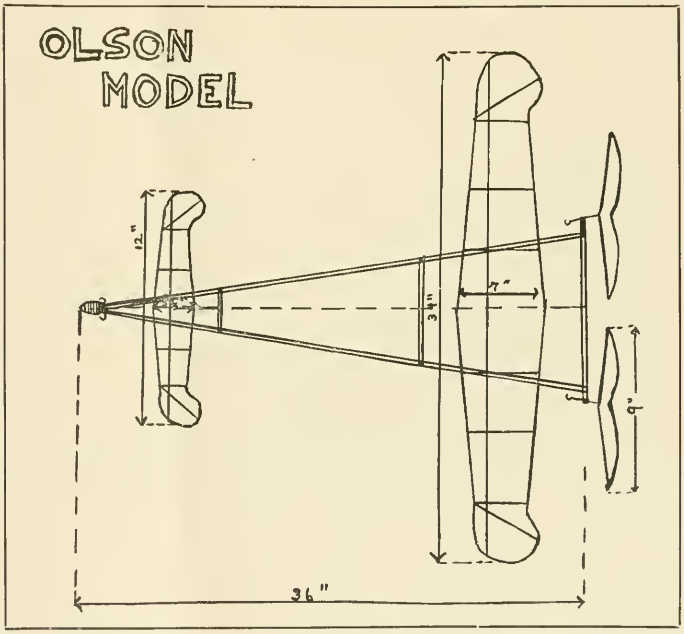
This, however, can be far more effectively brought about by another system of gearing, namely, by using two different sized cog wheels, the rubber being attached to the larger gear, the propeller to the smaller. The rule for determining the relation between the gear ratio and the length of the motor may be stated as follows: Eliminating the consideration of friction, etc., from the comparison, assuming that the number of revolutions obtainable from a given pair of motors, and the torque is the same in both cases, the friction representing the geared motor (length) as a part of the length of the motor without gears is the reciprocal of the square of the cub. root of the gear ratio. Thus if the gear ratio is 8 then the geared motor will be 1, B⅔ or ¼ of the other in length. This rule should be useful to builders of scale models, where a short motor is so desirable since the distribution of weight in full sized machines can be more closely approximated than would otherwise be possible.

THE OLSON MODEL

The model described in this issue is the representative type of the well-known Bay Ridge Model Aero Club. It is not so radical in design as some of the record holders. Inasmuch as its propellers both are smaller and turn faster than is usually the case with present day record holders, it is of that kind which, one would expect, ought to be an excellent machine for rising off the ground flights. This is in fact the case, for the Bamberger Brothers with models practically identical with the one now described but of course equipped with the necessary skids to enable it to get off, hold the American records for distance and duration in this kind of competition. Its official record without skids and launching from hand is 2,232 ft.

The fuselage consists of two spruce sticks each 36 inches long, 3-16 by 5-16 tapering at the ends, braced with bamboo cross pieces in the manner shown in the drawing.

The frame work of the wings is constructed of split bamboo, the ribs 7 in number are joined to the center piece and end pieces by thin thread and Ambroid Cement. The center rib is 7 inches long while the two outermost ribs are each 5 inches in length. The total length of the wing is about 34 inches, the covering is of bamboo paper, varnished with the club's own preparation. The front elevator, similar to construction to the main plane, measures 12 by 3½ inches. To those unacquainted with the method of shaping the wings and bending the ribs to a certain camber, it might be added that the usual means employed is to bend the bamboo over a flame.



The propellers are cut from white pine 1 inch thick and 9 inches long and have a pitch close to 2 ft. They are driven by ten strands of ⅛ inch flat rubber. Between 1000 and 1200 revolutions are obtained. The total weight of the machine is about 4½ ounces. The fine points of the model are the fact that the resistance is greatly reduced, even the cross pieces being in stream line form, and the excellent construction.

CLUB NOTES

The Long Island Model Aero Club is now in a very flourishing condition. Every Sunday contests are being held at the club grounds at Liberty Heights, Brooklyn, bringing out a large number of model flyers. The club meets at 401 Grant Ave., Brooklyn. At a recent election the following were chosen to be officers of the club: President, Charles Obst; secretary, L. Criscuoli; treasurer, George Gorges.

The last open contest was held on Saturday, October 26, for distance and duration from the hand. The results are as follows:

L Bamberger	....1196 ft.—1	76 3/5 secs.—1	2
C. V. Obst	......1146 ft.—2	61 1/5 secs.—3	5
G. Webber	...... 838 ft.—4	58 secs.—4	8
L. Ness	.... 500 ft.—8	71 1/2 secs.—2	10
Braun	.... 701 ft.—6	57 1/5 secs.—5	11

The Summit Model Aero Club has done some extensive flying with a monoplane glider (man carrying). It is not often that this type is used but members seem to have had considerable success, especially with towed flights.

NEW RECORDS

The duration record for models launched from the hand, made last May 30th by W. L. Butler, of Villegrande, California, namely, 170 seconds, has at last been authenticated. This displaces the old records of 158 4 5 seconds made more than a year ago by Armour Selly.

At the official trials of the Kite and Model Aeroplane Association the governing body in England, on September 27th, J. E. Louch broke the world's record for duration rising off ground with the extraordinary mark of 169 seconds. The old r. o. g. record of 81 seconds was held by Walter Bamberger of the Bay Ridge M. A. C. The model weighed no less than 8 ounces, which is well above the average weight of the American distance model.

In connection with the meet held on Columbus Day at Oakwood Heights by the Aeronautical Society a model contest was held.

The first event for duration tractors resulted as follows:

W. Bamberger, 65 3 5 seconds.

Lester Ness, 24 seconds.

Duration rising off ground resulted as follows:

W. Bamberger, 65 3/5 seconds.

G. Cavanaugh, 25 seconds.

The results were very mediocre owing to the high wind and cold weather.

A most interesting and novel experiment was made at Van Cortlandt Park, New York, on November 2d in the presence of a large crowd, when Harry Adler of the N. Y. M. A. C. tested out his new bomb dropping model. On the first occasion the model rose to a height of about 50 ft. when the bomb was automatically released.

A SUGGESTED DESIGN FOR AN OCEAN GOING CRUISING AEROYACHT

By PAUL J. PALMER

PAUL J. PALMER first became interested in aviation at the time the Wright Brothers were making their first public demonstrations at Fort Myer, W. Va. in the Fall of 1908. Mr Palmer forthwith built several gliders and the fact that a b plane glider of his construct.on was exhibited at the Alaskan-Yukon-Pacific Exposition in the summer of 1909 proves Mr. Palmer not only an enthusiast but an adept to this art from the beginning. In the latter part of 1909 Mr. Palmer formed the pioneer company on the Pacific Coast for the manufacture of gliders and planes and devoted a great deal of his time throughout the following year to model experimentation and the development of monoplane, biplane and triplane types and in 1911 he built an hydro-biplane of the single pontoon type. Mr. Palmer subsequently designed the first entirely closed body biplane which has since been brought out in England with improvements and modifications by A. V. Roe. The zest with which Mr. Palmer has entered into the aeronautical movement, the rapid strides he has made both from an industrial and scientific standpoint has earned him a well deserved success.

It has been the experience of the designer in hydro-aeroplaning that in inclement weather the airman and his passengers suffer a great many discomforts. Planing in a rainstorm or a cold bitter wind does not improve the health or complexion in the least.

The present need in aeroyachting is a boat that is safe in "all weather." The open cockle-shells at the present time give a person a shower bath gratis every time a young wave is vigorously slapped. By the use of a closed body this discomfort could be avoided. In a great many portions of the country, notably the Pacific Coast north of San Francisco, it rains a great deal, but when it rains there is little or no wind. The air conditions for flight are perfect, but the effect of the rain beating in the face is too much for a normal airman. Some persons do not like the pressure of the air at high speeds—it disarranges the "toilette" so. Therefore the closed body would make a bit with the "we-want-our-rights." There also is no possible chance for the sky-pirate (pilot) A. I. R. Gust, A. F. (Airman's Fear) to wed "for better or worse" A. Propeller-Gearorcontrol, and A. Skirtorflowing-Tresses.

The closed body type plane could be used to a very great extent in the taxi business, and probabliy would prove more profitable than the present open hull type, owing to its increased comforts and advantages.

The head resistance of the present time airboat hull, with the airmen, wind-shields, etc., projecting above is much more than is necessary, and the aerodynamical efficiency of such a hull is low. As the readers probably know, a stream-line form is a great saver of power, as well as an enhancer of speed. Therefore, in this design, the stream-line shape, as near as possible, is used for the hull formation.

HULL.

The hull is of the flat-bottomed "scow" type, fitted with a single step of three inch depth located under the centers of gravity and pressure. Upon landing the tip of the step would be the first to touch. The length of the hull is 30 feet, built in one piece—or sectional, if desired. The beam is 4 feet, giving ample inside space for three passengers in a seat located over the center of pressure, and two seats forward with a 15-inch aisle between them. The depth of the hull from "truck to keelson" is 5 feet 3 inches, and gives a headroom of 4 feet 9 inches in the "saloon."

The construction of the hull is the regular "rib and plank" type. The framing of the hull consists of a long piece from bow to stern on the sides of the hull; chine pieces for the bottom and top; a long central keel from front to rear the whole length of the hull; false keels for protection in landing on beaches, and vertical ribs spaced at the necessary places as indicated.

The planking of the lower half of the hull consists of an inner diagonal skin of ¼-inch plank, covered with canvas set in marine glue, then an outer horizontal skin of ¼-inch plank, covered with another layer of canvas set in marine glue, and the whole painted with marine paint. This method of construction gives maximum watertightness and minimum weight. The upper half of the hull and the roof, or "deck," consists of a ¼-inch horizontal layer of plank and canvas inlaid with glue, coated with spar varnish or marine paint. The bottom of the hull is planked in the same manner as the lower portion of the sides, with sheet metal sheathing from the step forward, preventing puncture by hitting floating objects when "taxying." If the boat is to be used around salt water, galvanized or copper nails or brass screws, should be used to prevent corrosion by salt water.

For the "lights," either clear wire-glass, which, although it may crack, is practically unbreakable, or celluloid could be used. A wire-glass window could be inset in the bottom of the hull for increased observation facility.

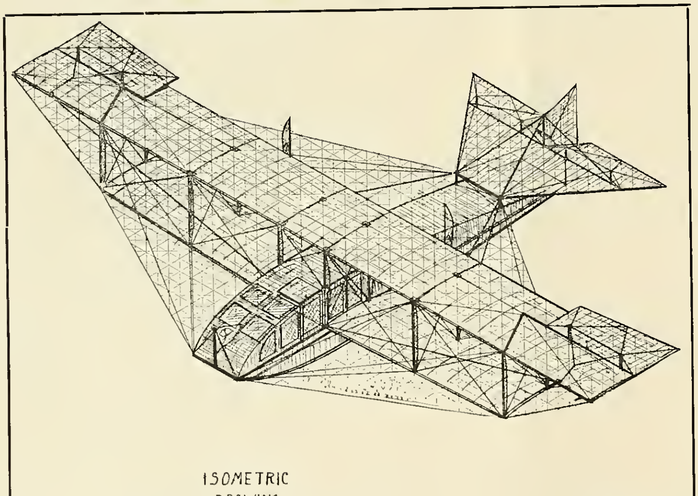
The engine bed stringers run aft from the gasoline tank for a suitable distance, location of the motor being such as to off-set the weight of the persons in the two forward seats. The motor compartment to be metal lined for fire protection, and is reached from without by removable metal sides, and a hatchway on the "deck."

The hull is divided into seven watertight compartments by bulkheads indicated on the drawings by "B. H."

Ingress and egress is obtained by a raising hatchway and an outwardly opening door.

In the "saloon" the seats could be upholstered in a comfortable manner and so arranged as to be extended to make a couple of berths, enabling a couple of persons to make a long cruise for pleasure or otherwise. The two forward seats could be arranged for dual control, and an instrument board could be readily installed, whereon the speedometer, altimeter, tachometer, incidence indicator, tray holder, clock, etc., could be mounted. Compartments could be placed at the sides for the storing of articles, and the seats made into cabinets for the carrying of supplies, such as "grub" for a cruising trip, cooking apparatus, and the like, an acetylene or electric lighting system could be installed, and a wireless station for a couple of hundred mile radius carried, making a regular flying palace, "Fit for Ye Gods." Great for "That fishin' trip next summer. Eh? What?"

Right back of the rear passenger seat the gasoline tanks with a capacity of 125 gallons are installed, the filling plugs being arranged "on deck." The mileage radius with two persons and the tanks full of gas would be from six to seven hundred miles. With full load of five passengers about 30 gallons of gas could be carried, enabling a trip of four or five hours to be made.



ISOMETRIC DRAWING of SUGGESTED AEROYACHT

Paul J Palmer. Oct 13.

PLANES

The lifting surfaces are of the double surfaced type a la Wright, with built-up ribs, covered with Goodyear, naiad or other suitable fabric; longitudinal spars laminated for greater strength and of the shape shown in drawings. The ribs are spaced on 12-inch centers and are made up of ¼ by ¾ spruce battens, and separated by ½ x 1¼ x 1½ webs. On section ends and strut location points box ribs are to be used, built up of ¼ x 1½ spruce battens separated by a ⅜ cut-to-shape side. Steel tube could be used to brace internally the surface structure to give additional strength. The upper plane could be divided, as shown, into three sections, two 16-foot and a 20-foot; or into five sections, two 16-foot, two 8-foot, and a 4-foot center section. The 16-foot sections on the upper plane have eight feet of their trailing edge cut away for the location of the ailerons. The lower plane is in two 16-foot sections, and has a dihedral angle, positive angle, of 9-inch rise in the length of 16 feet. This dihedral angle, aside from its enhancing of the lateral stability, aids in keeping the ends of the lower plane out of the water. "Cans" of the shape shown are efficient practically and aerodynamically. The struts are laminated and of the shape shown, tapering to a smaller size at the ends; are fitted at the ends with a threaded-head lag screw, and metal ferrules for connection and attaching to the surfaces. All guy wiring to be doubled for increased safety, and of 1500-pound cable. Planes to be trussed as shown.

CONTROL SURFACES.

The ailerons have an area of 30 square feet each, and are of the trapezoidal shape as shown. This shape, with the longer side at the end of the plane gives greater efficiency, as the disturbing forces are greater on the end of a plane than they are nearer the center. The ailerons operate a la Curtiss and are controlled by the instinctive shoulder forks. Of course, the control system could be arranged to suit the individual tastes.

The rear stabilizing fin is 56 square feet in area, is trapezoidal in shape, and is placed at a dihedral angle to the angle of incidence of the main planes. Constructed of spruce strips, surfaced, and supported by steel tubing, as shown on drawings.

The two elevating planes are 15 square feet each in area, and are parallelograms in shape. Constructed of spruce strips and connected to the hull by steel tubing, as shown.

The elevators work in conjunction with each other, and are controlled simultaneously.

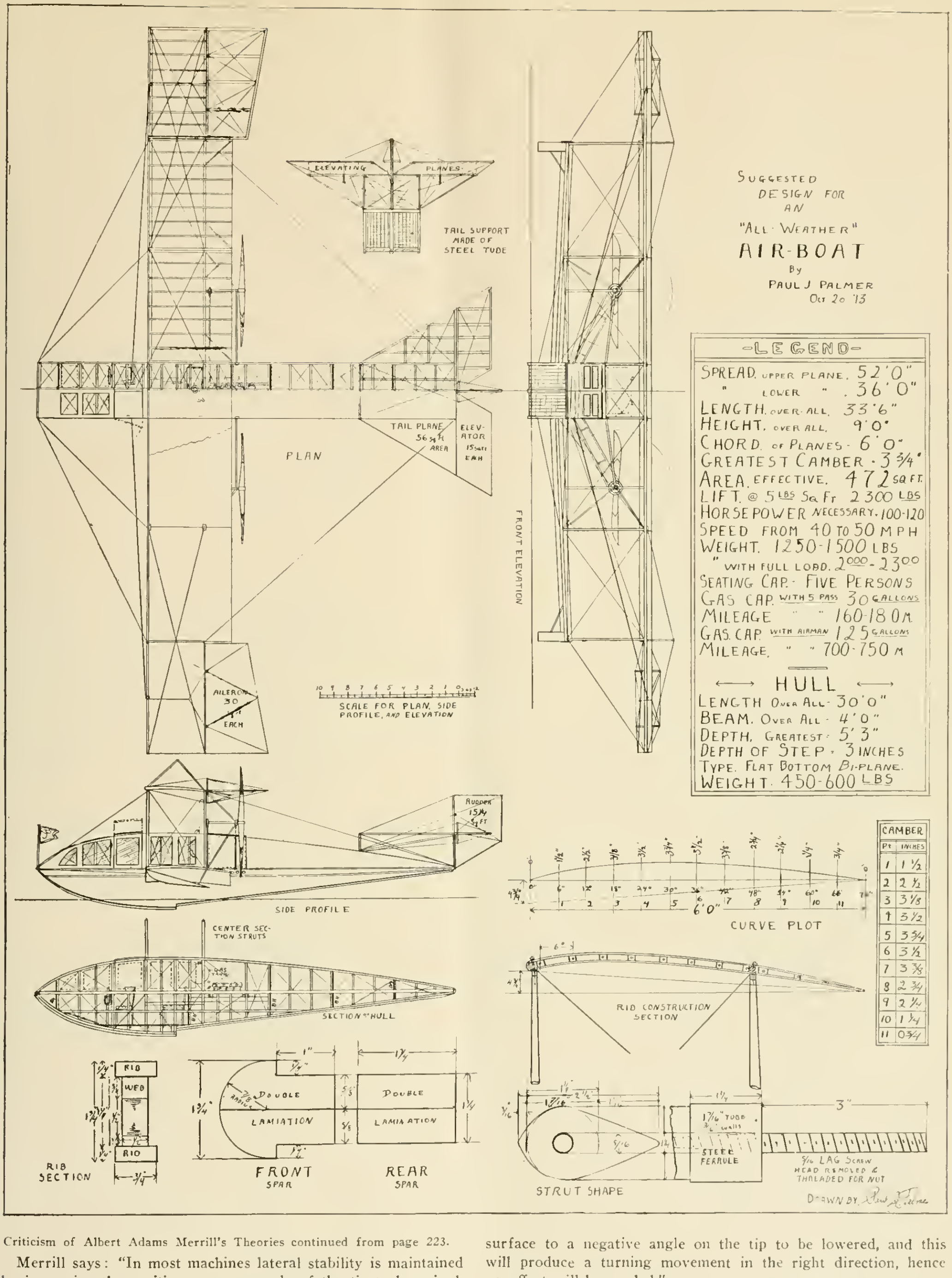
All control wires to be doubled and of steel cable. Bowden wire turns and friction points are to be advised instead of pulleys owing to the wearing effect of the pulleys on the cable.

POWER INSTALLATION.

The motor should be water-cooled, and of from 100 to 120 horsepower or greater if more speed is desired. The motor could be muffled and equipped with a self-starter of some type. The radiators could be mounted on the deck between the rear center struts and force-fed either by air pressure or by pump.

The propellers, two in number, are driven by chain or bevel gearing. A disengaging clutch between the motor and propellers would be a valuable asset, as it would enable one to test the motor without leashing the plane. If chain drive is used, tubing containers could be arranged as on the Wright.

The speed of the boat, conservatively speaking, would be in the neighborhood of forty to fifty-five miles an hour, depending on the load and the conditions of the "air-lanes."



Criticism of Albert Adams Merrill's Theories continued from page 223.

Merrill says: "In most machines lateral stability is maintained by increasing the positive pressure angle of the tip to be raised. This tends to retard that tip and turn the machine in the wrong direction. This false turning movement is offset by the vertical rudder. It is possible to maintain lateral stability by moving a surface to a negative angle on the tip to be lowered, and this will produce a turning movement in the right direction, hence no offset will be needed."

This defect is not present in the Curtiss machine, where the high side is retarded more than the low one because of the down trend that exists between the wings.

THE BLASIAR FLYING BOAT

By EARL F. BEERS

The new Blasiar Flying boat is the result of two years of practical experience with both hydro-aeroplanes and flying boats.

Mr. Blasiar has been a close student of aviation from both a theoretical and practical standpoint during the past four years. Up until October of this year, Mr. Blasiar was employed by a promient aeroplane company as superintendent of construction. Mr. Blasiar is also an experienced pilot (License No. 230) and always flies his machine on their test flights.

Mr. Blasiar is prepared to build either land or water machines of his own or any special design, and has plans underway for a new monoplane which he will bring out in the near future.

Mr. Tweed, who purchased the first Blasiar flying boat, is a well known hydro-aeroplane pilot, and during the past summer made many notable flights. Mr. Tweed is to be married in January, and he and his bride will take their honeymoon trip in new boat, making an extended tour of southern waters.

General specifications of the Blasiar flying boat: Spread of upper wing, 37½ ft.; spread of lower wing, 31½ ft.; chord of upper wing, 5½ ft. chord of lower wing, 5 ft.; gap, 5ft. 8 in. area of supporting surface, 345 sq. ft.; length over all, 25 ft. 7 in.; length of hull, 22 ft. 10 in.; height from bottom of boat to top of upper plane, 8 ft. 8 in.; power plant, Curtiss motor driving propeller at ⅝ engine speed. Motor is started with a starting crank just back of seats, Total weight of machine without pilot, 1.100 lbs.

HULL

The hull is built in two sections for convenience in shipping, and is divided into six water-tight compartments. The body of the boat is built up of spruce and ash ribs, spaced four inches apart, and double planked with white cedar. Brass screws are used throughout for fastenings. Following the latest practice in flying boat and speed construction, the boat is constructed with a V bottom from the step forward to the bow, gradually flattening out at the bow. The V bottom construction enables one to build a much stronger boat for the same weight than the old flat bottom design and more easily handled on the water. We wish to call attention to the engine mounting and bulkhead construction. The engine beds are placed on top of two of the bulkheads, one bulkhead under the front wing spar and one the rear. The space between the two bulkheads is divided into three compartments, by two centerboards extending from the bottom of the engine beds to the bottom of the boat, running lengthwise from the rear bulkhead to the front of the seats. This construction makes a boat which will stand a great deal of hard usage. The entire boat up to the sprayshield is covered with sheet steel. The sprayshield is built up of mahogany, the cockpit is lined with the same material and upholstered with leather, and all fittings are of highly polished brass. Beside the sheet steel with which the boat is covered, the section in the vicinity of the propeller has an extra covering of armor plate, to protect the hull and control wires in case of propeller breaking. The bottom of the boat is protected by one large skid running the entire length of the boat in the center, and two smaller ones on the side of the boat.

WINGS

The upper wiring is built in five sections, and the lower in three for convenience in shipping. The wing spars have a gradual taper from the engine section to the tip. The planes are covered with a special linen treated with emaillite. The planes are guyed throughout with galvanized steel wire cable. In the three center sections 7/64 in. cable is used. The outside sections, 3/32 in. cable is used. All left wires are doubled. All wires are fitted with Bleriot turnbuckles. An improved steel strut socket is used, so designed that struts can be removed and planes packed without loosening wires. All sockets, tubing and metal fixtures are covered with baked enamel. A special steel hinge is used in fastening the aileron rudder and the water flaps, doing away with screw-eyes. Another new feature in this machine is the means of adjusting the angle of incidence of the stabilizer The fin projecting through the stabilizer allowing it to be raised or lowered and held in any desired position by an upright slotted brace resting on the boat.

CONTROLS

The control is by the familiar wheel and shoulder bow, although any control can be fitted. The control wires are 3/32 in. nonflexible cable doubled throughout. The ailerons are worked on the negative angle system.

REVIEW OF RECENT AERONAUTIC PATENTS

By LESTER L. SARGENT

Here are some of the recent inventions of interest to airmen, for which United States patents have been issued during the past six weeks:

A Flying Machine, Matthew A. Batson, of Springfield, Mass., inventor; patented November 4, 1913. 1,077,786.

This machine belongs to the biplane type, but includes a series of planes in each tier. One of the striking novel features are elastic elements attached to each of the planes and fastened to the rigid framework beneath so as to permit the planes to automatically yield in an upward direction to a limited degree of upward movement so that the planes may present an expanded V-shape. The arrangement of wings in series is also designed to increase the stability of the machine. Wing elements are employed in connection with the tailpiece. Duplicate, independently operative motors either of which alone is capable of driving the machine, is a feature of this invention.

Aeroplane, Hugo C. Well, of New York City, inventor; Frederick A. B. Meinhardt, of New York City, assignee of one-half interest in the patent; patented November 4, 1913. 1,077,744.

This biplane has two pairs of auxiliary planes, one set forward of and the other in the rear of the main planes. Rudders are pivoted on the head and tail between the auxiliary planes. The auxiliary planes are arranged for rocking simultaneously relative to the main frame, the auxiliary planes being pivotally connected to the main plane. Vanes are also pivoted above and below the main planes, which may be operated in pairs, simultaneously. The inventor declares that it is possible to turn a corner much more quickly and with more safety with his machine than with other aeroplanes.

Airship, John C. Schleicher, of Mt. Vernon, N. Y., inventor; patented November 4, 1913. 1,077,563.

The front and rear planes of this machine have a novel arrangement to effect a parachute-like action on the descent of the machine, automatically effected in case of the operator losing control. The main planes have novel door frames normally alined with the planes, but independently operable, for guiding the machine.

Flying Machine, Charles E. Baker, of Hamilton, Ohio, inventor. Patented October 28, 1913. 1,077,114.

Not an aeroplane, but a device of the parachute type, for use with an aeroplane, by which the aviator may separate himself from the flying machine and descend in safety.

Flying Machine, Charles R. Witteman and Adolph D. Witteman, of New York City, joint inventors. Patented October 28, 1913. 1,077,111

A monoplane having a cruciform frame construction, with separate vanes for stabilizing the machine. The parts of the machine as a whole lie within the geometrical outline of a circle. Particular attention is paid to the strong and durable frame construction provided.

Flying Machine, John N. Williams, of Derby, Conn., inventor. Patented October 28, 1913. 1,076,803.

A flying machine of the helicopter type, in which flexible arms are provided for the propeller blades, their pitch being variable by means of adjustable guy wires. A parachute device is arranged for release when the machine tends to descend against the will of the operator.

Ballast Device, Ralph A. D. Preston, of Akron, Ohio, inventor. Patent rights acquired by The Goodyear Tire and Rubber Co., of Akron, Ohio. Patented October 21, 1913. 1,076,060.

This is a ballasting device for use with dirigible and other balloons, the ballast to be water pumped through this device to the balloon to replace weight lost by use of fuel or due to expansion of gas. The device includes a tube to be thrown out from the balloon into a body of water over which the balloon is passing, and a pumping device on the end of the tube operated by the movement through the water.

Aeroplane, Harry W. Macomber and Frederich H. D. Bergman, of St. Louis, Mo., joint inventors. Patented October 21, 1913. 1,076,218.

A series of planes are provided with edges overlapping, and means are provided for modifying the lateral movement of the machine to permit of a lateral drift when desired, during its forward movement. A further novel feature is the provision of devices for shifting the power plant or engine to move the center of gravity rearwardly to facilitate the rise of the machine.

Equilibrator for Flying Machines, Edwin D. Stevenson, of Wadsworth, Ohio. Patented October 14, 1913. 1,075,477.

This device comprises a pendulum controlled helicopter employed as an auxiliary to an aeroplane, supported above its center, and adapted to swing relative to the aeroplane. The helicopter is normally positioned to rotate in a horizontal plane, but may be rotated in any position in which it may be supported relative to the aeroplane structure. It is operated in connection with the motor and is designed to exert a constant upward pull, so that when the machine tilts out of normal position the upward pull will tend to restore its equilibrium.

Flying Machine, Orville Wright and Wilbur Wright, of Dayton, Ohio, inventors and assignors to the Wright Company. Patented October 14, 1913. 1,075,533.

This is the Wright aeroplane with the pendulum and other balancing devices which constitute an automatic controlling mechanism for maintaining the balance of the machine about longitudinal, lateral and vertical axes. A small horizontal plane is mounted on the frame at a small negative angle with reference to the main aeroplanes, and having a limited vertical movement and means, including a counterbalance, for adjusting the auxiliary vane, and for varying its angle relative to the aeroplane, are provided. A fluid pressure cylinder and an air storage receptacle and an arrangement of pistons in connection with these devices to operate the rudders and alter the angle of incidence of the vane and of the aeroplanes are features of the invention. A pendulum is a feature of the automatic balancing mechanism. It is normally at right angles to the aeroplanes. When the machine tilts the pendulum swings and operates a valve, admits pressure at one end of the piston in an air cylinder, and by various connecting rods, etc., adjusts the vertical rudder and lateral portions of the aeroplanes to restore equilibrium. The Wright automatic regulating mechanisms are applicable to any form of flying machine having movable parts. There are forty-six claims in the patent, and all its interesting details can not be reviewed in brief space. The underlying idea is to detect changes in the angle of incidence at the moment they occur, and to have these mechanical "detectives actuate automatic mechanism to counteract and correct the change of inclination at once.

An Automatic Balance for Aeroplanes, Leon Spiro, of Everett, Wash., inventor. Patented October 7, 1913. 1,074,659.

The object of this invention is an automatic balancing mechanism, a pendulum lever being provided, suspended from the top plane, and which, when the machine tips toward one side, will throw a slidably mounted clutch collar into engagement with a clutch collar on the inclined side, and thus operate a shaft on which is mounted a propellor at the side of the machine.

Flying Machine, Rubino Plastino, of New York City, inventor. Patented Ocotber 7, 1913. 1,075,302.

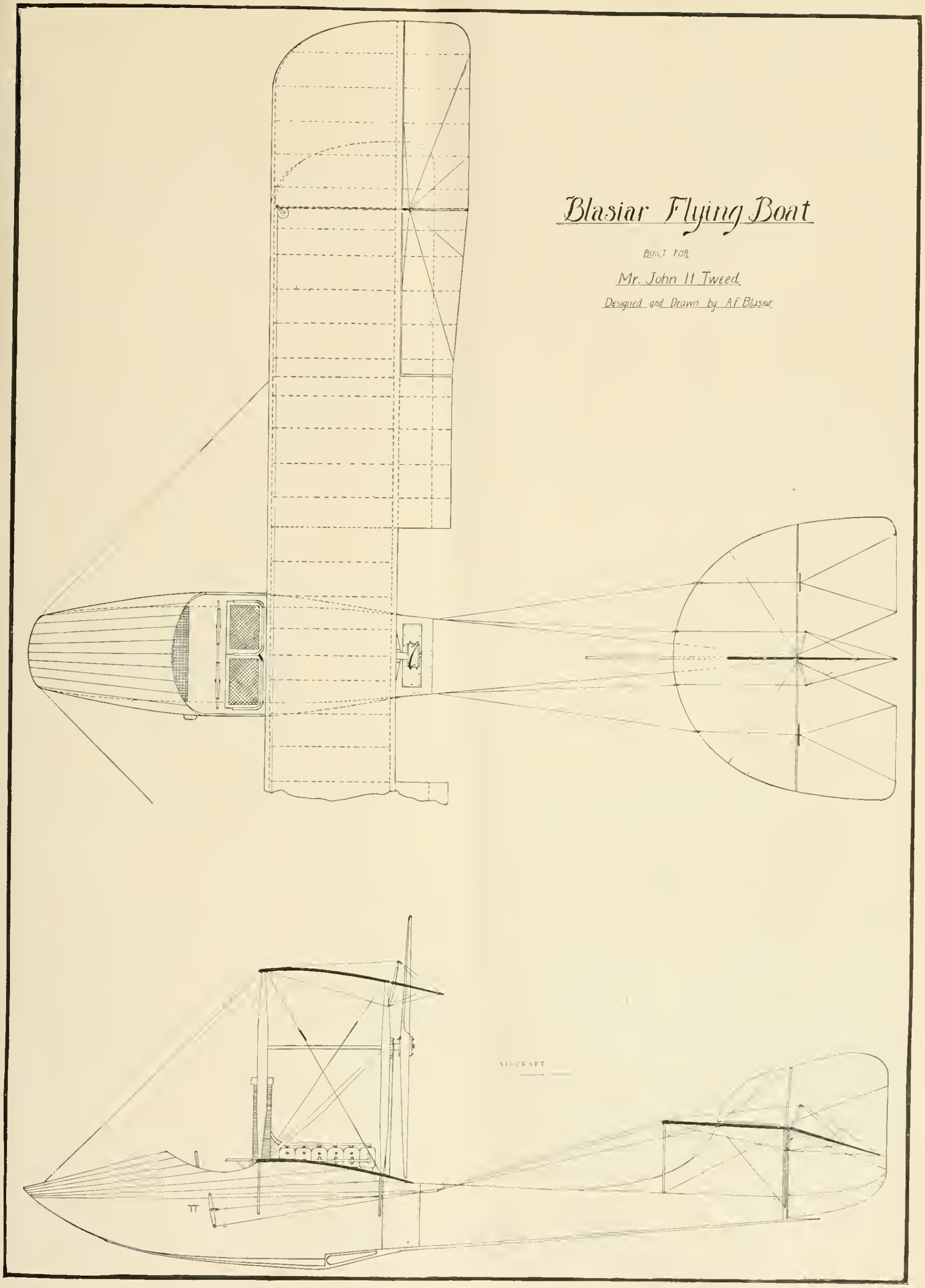
The machine is a hydroplane having a central sustaining plane and two lateral sustaining planes. The central sustaining plane can be moved longitudinally backward and forward, and the lateral sustaining planes can assume different positions, so as to be lowered or raised in relation to the body of the machine. "The possibility of moving the central plane forward," says the inventor, "adds much to the safety of the device, as in this case the weight of the same will be more evenly distributed between the fore and aft parts of that plane, which acts thus like a parachute."

System of Aeroplane Control, Edson F. Galladet, of Norwich, Conn., inventor. Patented September 30, 1913. 1,074,257.

The invention is for the purpose of maintaining the lateral balance of flying machines of the aeroplane type. In its preferred form a single auxiliary plane is mounted centrally above and a second plane is mounted centrally below the main fixed wings of a monoplane or multiplane machine, and the lateral balance of the machine is controlled by causing both upper and lower auxiliary planes to tilt differentially to one side or the other, to the required degree.

Shock Absorber for Aeroplanes, Wesley N. Ensign, of Whitestone, N. Y., inventor. Patented September 30, 1913. 1,074,499.

This device is pneumatically operated, a cylin-


Blasiar Flying Boat
BUILT FOR
Mr. John H Tweed
Designed and Drawn by A.F Blasiar

der and plunger furnishing the shock absorbing mechanism.

Autoplane, Paul Wizel, of Berlin-Weissensee, Germany, inventor. Patented September 23, 1913. 1,073,648.

This invention may be used on the ground as well as in the air or on the water, combining the functions of an automobile and hydroplane.

Safety Support for Flying Machines, Ralph P. Fox, of Fort Hancock, N. J., inventor. Patented September 23, 1913. 1,073,977.

This invention provides auxiliary balancing and supporting surfaces, constituting extensions beyond the front, rear and sides of the main supporting surface, acting to resist any tendency of the machine to move unduly out of a state of balance or poise. Six auxiliary balancing surfaces are employed, preferably disposed in a triangular arrangement at the front and rear of the machine. These balancing members are formed of upper and lower convaco-convex disks, having their concave sides facing, and are constructed of canvas.

Rudder for Aeroplanes, Harry A. Orme, of Wesley Heights, D. C., inventor. Patented September 23, 1913. 1,074,063.

The invention is a compound steering and elevating rudder, comprising a horizontal and vertical planes and having foot-operated means for controlling the steering rudder and hand operated means for controlling the elevating plane of the rudder. The rudder frame is connected pivotally with the main frame, so as to have a limited upward movement without transmitting any strain or pressure or twist to the planes of the machine.

Aeronautical Apparatus, Charles D. Burney, of Kilmeston, Alresford, England, inventor. Patented September 16, 1913.

This hydroplane is devised to obviate the necessity for employing supporting bodies of the "float" or "punt" type which are liable to injury with consequent loss of buoyancy of the apparatus as a whole. The novel features are dependent and laterally diverging hydropeds affixed to the machine and carrying water propellors, and having hydroplanes mounted on the hrdropeds. By arranging water propellors in conjunction with the hydroplanes, a portion of the longitudinal thrust exerted by the water propellors is converted into "lift" imparted to the apparatus by degrees, for the transfer of the weight to the aeroplanes as the machine is launched in flight.

Stabilizer for Aeroplanes, Henry C. Fisk, of Stafford, Conn., inventor. Patented September 9, 1913. 1,072,710.

The stabilizing plane is located at a distance above the supporting planes and because of the upwardly and outwardly curving sides, tends to keep the machine on an even keel. "Experiments with my construction," says the inventor, "have shown that my stabilizer will return an aeroplane to an even keel no matter what position the aeroplane is when it is launched into the air, provided the height is sufficient."

NEWS IN GENERAL

By D. E. BALL

California News

By R. H. Blanquie.

Inspired by the editorial comments in the November number of Aircraft encouraging Aerial Derbies, and also by reason of the fact so well set forth in the November Aircraft regarding the success of the Aerial Derby recently held in New York and conducted by the Aeronautical Society, a number of San Francisco aeronautical enthusiasts are planning an airboat derby race around San Francisco Bay, which affords the greatest facilities for such an event, and if properly organized and given sufficient financial backing, there is no reason why it cannot be made a great success.

The course as outlined by the writer will approximate a distance of 30 miles. The start and finish could be made from opposite the Fair Grounds, San Francisco; the first stop would be Sansalito; the second stop Richmond; the third stop Lake Merritt, Oakland, where a stop could be made to afford people on that side a closer view of the airboats and also lead the Oakland Chamber of Commerce to award prizes.

It is reported that Jules Pegoud, renowned for his upside down flying, will be seen in San Francisco in the course of a tour through the United States, under the management of J. B. Golilis, a British moving picture magnate.

While the U. S. cruisers, St. Louis, Charleston and Pittsburg were entering the harbor of San Francisco, to lend a distinction to the local Portola Festival, Silas Christofferson on board his trusty hydro-aeroplane, left the shore and flew out to welcome the warships. This same aviator was much in evidence during the fete, flying about the bay skimming over its waters and soaring playfully close over and around the war-ships at anchor and other boats in the harbor, much to the interest of the spectators.

Seated beside Christofferson in his hydro-aeroplane, Mrs. C. A. McDonald, a young society matron of Oakland, flew about the bay dropping pamphlets and cards on the decks of ferry boats and other bay craft with the purpose of announcing an extravaganza to be given in benefit of the Children's Hospital of the Bay Counties.

J. A. Hoffman has received the Hall-Scott engine with which he will equip his original designed monoplane. As soon as it is installed trials will be made on the Sansalito side of the San Francisco bay, the aeroplane to be mounted on floats. If it proves successful, as it no doubt will, a flying school will be established and monoplanes of the same type will be manufactured and put on the market.

Seattle and Puget Sound News

By Paul J. Palmer.

On October 19th, Mr. G. W. Stromer, a Tacoma airman, attempted to make a flight from Tacoma to Centralia, Washington, a distance of about fifty miles. A short distance out of Tacoma he came to grief, falling about fifty feet. He escaped without injury, but smashed the plane.

On October 27th, 28th and 29th, the time of the Superior Court was taken up in hearing the libel suit of Capt. J. V. Martin, the designer of the Queen-Martin biplane, against the Seattle Times Printing Company. The case was brought about by the criticisms of his flights during the 1912 Potlatch, published in the Times, and written by Mr. Evans, who is the only regularly appointed aeronautical editor of a daily newspaper on the Coast. Following are some of the criticisms alleged to be libelous by Capt. Martin.

"Some of his flights were accomplished with all the dainty grace and ease displayed by a fat bear trying to remove a burr from his tail."

"The district over which Capt. Martin made his flights is densely populated with trees and caterpillars. Both cheered loudly."

The Times, however, when Capt. Martin did make good flights gave him full credit for them. After several good flights, the following was said:

"Well, whaddyuhknowabouttit? Cap'n Jimvee Martin, in the language of the surprised onlooker, 'has flew,' Honest t'goodness he has; and best of all, it can be proved. * * * The Nevada Cloudburst was no more surprising to the innocent bystanders."

"Capt. Martin has at last, after five days of stalling, demonstrated that he has the ability to fly. * * * The flight last evening was one of the prettiest and most graceful witnessed during the Potlatch celebration."

The verdict of the jury upheld the Times and Mr. Evans in their criticisms of Mr. Martin's exhibition by returning a verdict in favor of the Times. The points involved in the case were not technical aerodynamical questions, but were from the showman's standpoint and involved the right of a newspaper to criticise a performance in caustic or ridiculous language. There were numerous "hot-aironoughts" present at the trial, and the Court had a hard time shutting off the outbursts of laughter occasioned by some of the evidence introduced. This is the first case of its kind before a Court in the Union, and is important for that reason.

Mrs. Alys McKey Bryant, the widow of Mr. John Bryant, made two flights over the Seattle Aerodrome on Friday, October 31, each lasting about a quarter of an hour. They were made for the motographer, who filmed them for use in Mrs. Bryant's vaudeville lecture tour. She will soon encircle the Smith Building tower for the same purpose.

Mr. Frank Bryant, the brother-in-law of Mrs. Alys Bryant, made a flight on the same date, cutting up carefree capers calculated to cause the casual customer to have the crimps and creeps. He dove, dipped, dropped and spiraled in an "Ishcabible" (I should worry) manner. Mr. Bryant has just closed a very successful exhibition season, having flown four days each at Concrete, Wn., Colville, Wn., Yakima, Wn., where he was forced to land within quarter of a block from where Phil Parmelee dropped, and Colfax, Wn. For three days each at Davenport., Tekoa, two days at Kellogg, Idaho, and Mullin, Idaho. Was at Potlatch, Wn., for five days. He plans to winter in Seattle, preparing for the '14 season.

To Raviate:

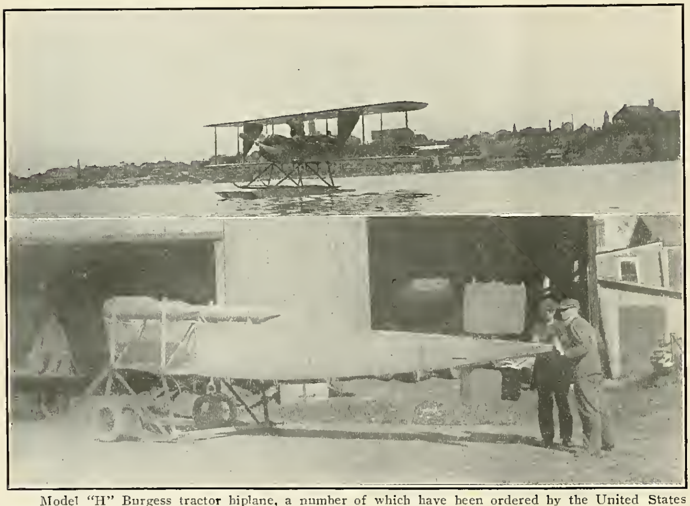
Elevator Boy: "Going up, mister?"

Absent-minded Airman: "Nope, not t'day—too blamed windy."

Pennsylvania News

By W. H. Sheahan.

The Aero Club of Pennsylvania's big balloon, Pennsylvania I, made a short flight on October 11th. Owing to the extremely heavy atmosphere the bag failed to rise until all the ballast, with the exception of six bags, had been thrown out. The balloon then rose slowly; sailing in a northward direction from the Holmesburg Field. In a little less than two hours a safe landing was



Model "H" Burgess tractor biplane, a number of which have been ordered by the United States Signal Corps, and which have recently passed most successful tests. The hydroplanes on which the tractors are mounted are of special type. The machine is easily convertible into a land machine, the work being accomplished in less than 15 minutes. The whole machine can be taken down ready for shipment inside of half an hour. The speed of the machine is increased over the 1912 type by three or four miles on account of the refinements in construction and the use of the Burgess linen. It now has a speed ranging from 45 to 60 miles per hour.

reported as being made at Grenoble, Pa., twenty-five miles distant.

Pilot Atherholt was in charge, with Dr. Jerome Kingsbury of New York and A. W. McLellan of New Orleans as passengers. Both these passengers are making these ascensions preparatory to securing aeronautical licenses; this being Mr. McLellan's second trip and Dr. Kingsbury's third.

On October 20th, in Pennsylvania I attempted another ascension from the Holmesburg Field, but when almost inflated an unexpected gust of wind threw the partially filled bag against a nearby tree, tearing a large hole in the envelope and causing sufficient damage to make a postponement of the proposed flight necessary.

Leo Stevens of New York was to have acted as pilot on the trip with Dr. Kingsbury and Mr. McLellan as passengers. An attempt to repair the tear was made, but the high winds had caused other small rents where the balloon had been dragged over the ground and the flight was eventually postponed for a later day.

In a most entertaining lecture delivered by E. Berliner, famous inventor, also designer of the gyro aviation motor, before the Franklin Institute of Philadelphia, Mr. Berliner declared that this government was deplorably tardy in not recognizing the need of aeroplanes for the Army and Navy.

The Franklin Institute is one of the foremost scientific institutions of the country; being founded in 1824. The library of the institute of many thousands of volumes is exclusively scientific. Arrangements have been made for several lectures on aviation and other aerial topics for the winter programme.

Mr. Orville Wright is scheduled to address the members of the institute during the latter part of November, while Dr. Lahm of Washington lectures later in the season. The Aero Club of Pennsylvania will co-operate with the management of the institute on the above occasions.

Wm. Yorke of Philadelphia, who has built quite a few gliders of the biplane type, is at present constructing a Nieuport mono after the plans of the military two-seater lately published in AIRCRAFT. Slight changes have been made and a reduction in size; as the machine is being built single seater. Yorke expects to have same completed for early spring tests.

Lengthy tests are now being made on the Miami River of the new aeroboat turned out by the Wright Company as shown in the pictures above. Notwithstanding the extremely restricted nature of their proving grounds—the river being very narrow and winding—this two-propeller, short-hulled flying boat with outrigger controls has been manoeuvred between the trees and banks of the river with the greatest of ease, thus showing that flying boats can be utilized to advantage on the smallest of rivers as well as the larger rivers, lakes, bays and the open sea.

Western Notes.

By DR. E. R. CARY.

The report comes from Delta Colorado that H. W. Blakely, the aviator, with Tom Seaton, the Philadelphia National League pitcher, and Will Lancock, acting as guide, had narrow escape from being mauled by a wounded bear, which they shot during the three days hunt they were on the latter part of October.

J. B. Blanchard, who has been investigating the flying machine and laws of soaring flight since 1894, is trying to interest Denver and Colorado capital, the descriptions we have seen of his model which is 13 by 30 feet, over all, indicates that it has stabilizing effect from always heading into a gust on "Weathercock" principle, which, while not new, he applies in a different manner.

Albert Bond Lambert of St. Louis, has been active in enlisting volunteers for United States Reserve Aviation Corps, so far he has eighteen recruits. The seven from St. Louis are Anthony James, the Benoist Pilot, also Hugh Robinson of same company; Hillary Beachy, Wm. Bleakly, William Assman, Paul McCollough and Capt. H. E. Honeywell. The other western men are Glenn Martin, California, as are Chas. F. Willard, Harry Holmes, Roy Knabensue and De Lloyd Thompson of Chicago. The others are from New York, Lincoln Beachy, Francis Weldman, the Curtiss pilots, and Brookins, the Wright aviator, who quit exhibition flying some time ago, and with Hoxsey and Johnston, did so much to popularize the Wrights in early days of flying.

While in Denver on other business your correspondent investigated the aviation situation here and finds that there is small amount of interest shown, the book stores report the sale of twice as many AIRCRAFT were sold as any other aero publication.

Llynn Tatheson, who backed the first Colorado machine, has disposed of his auto business and is now in California, our informant could not state whether he was going to be further interested in one of aero schools or not.

Ivy Baldwin in his twin-float hydro, gave many excellent exhibitions at the Manhattan Beach during summer, but was out of city days. I was there so did not get to see him.

The Young Aviation Colony are preparing to move. Negotiations are pending whereby they will remove to Iowa, is the report from Kansas City.

Reports from Kansas indicate that C. A. Cessna is again astride his Bleriot copy of his own construction, which has been overhauled.

Christofferson's flights in Utah has stimulated some of the Ogden and Salt Lake amateurs to try their hands as constructors. However, we are unable to learn details of construction.

Bath, N. Y.

The Thomas Brothers report that the summer season of 1913 was the most prosperous of their career, both from the manufacturing and exhibition standpoint. Their exhibition flyers, Walter E. Johnson, Earl V. Fritts, Frank Burnside, Fred Eells, Ralph Brown, have been kept busy all season filling engagements both with over-land and over-water machines and the most remarkable part of it is the whole season was conducted with less breakage than in any season heretofore, notwithstanding that there were more engagements filled. Furthermore, owing to the increased efficiency and improved construction of the latest Thomas machines, engagements were filled under the most inclement weather conditions.

The Thomas boat is gaining general favor everywhere and a great many sales have been made this season and their owners having met with such great success all indications point to heavy orders for spring delivery.

Walter Johnson, who has flown every make of machine turned out by the Thomas Brothers during the past three years, has purchased a Thomas flying boat with which he contemplates a trip down the Mississippi River to New Orleans, where he will locate during the winter and open up a school for the purpose of giving instruction on the flying boat. It is understood he already has two pupils to begin with. Accompanying Johnson as his chief assistant will be Earl Beers, a graduate of the Thomas flying school and probably one of the best all round aeronautical mechanicians in this country. In fact, much of the success of the exhibition flying by the Thomas flyers this year was due to Beers' masterful service in keeping the flying machines in good order.

Mr. A. F. Blasiar, formerly with the Thomas and Curtiss companies, has now branched out as a builder on his own account. Blasiar has spent about a year in construction work at the Curtiss and Thomas factories and last winter took the flying course at the Thomas School. He obtained his pilot certificate last spring and after filling several exhibition dates in the early part of the season, served as foreman in the Thomas shop until just recently.

It is Mr. Blasiar's intention to start in the manufacturing business in a modest way and work his way up to the top of the ladder as time passes by. It is stated that he has already secured three orders for flying machines, one an order for a flying boat for Mr. John H. Tweed and an overland machine for Mr. W. H. Minnerly; the name of the party who ordered the third machine is at present withheld.

The Blasiar flying boat, fitted with a Curtiss 100 h. p. motor will be listed at $3,500, or if fitted with a 65 h. p. Curtiss or Kirkham, it will be sold for about $2,500.

Preliminary tests with an electric aeroplane stabilizer an invention of A. J. Macy of Chicago, were made by Aviator DeLloyd Thompson at Hopkinsville, Ky., recently, in which a flight of 20 minutes' duration was successfully accomplished. It is stated that in this test, the aviator's hands were off the control levers and the aeroplane was controlled entirely by the electrical apparatus for fifteen minutes.

Roebling Wire Rope Used Everywhere.

A beautifully illustrated bulletin concerning the wire rope used at Panama was received recently by AIRCRAFT from the John A. Roebling's Sons Company of Trenton, N. J. The illustrations and text of this bulletin are advance sheets that will appear in the history of the Panama Canal, its construction and builders which will be shortly published by the Historical Publishing Company of Washington, D. C.

This bulletin certainly gives one a proper idea of the position that the John A. Roebling's Sons Company, the wire rope manufacturers, hold in the industrial world. The reason why the Roebling wire and wire rope is now used almost exclusively by the builders of aeroplanes in this country can be readily understood after a perusal of the part taken in the making of the history of the Panama Canal by the pioneer wire rope manufacturers of this country.

Furthermore, this bulletin shows that the John A. Roebling's Sons Company were not only the first to manufacture wire rope but also the fact that they were the first to enter into every new industry created and then became a necessary part of that industry.

United States Aviation Reserve.

A. B. Lambert, the well-known aeronautical promoter of St. Louis, is the father to a new organization called the United States Aviation Reserve, the main purposes of which are as follows:

In case of war to place at the disposal of the United States Government immediate service of members of this corps;

To maintain and have available information as to the respective qualifications of each member, and address;

To place on file with the War Department, Navy Department and the United States Signal Corps, the record of each member, type of aeroplane, type of control, and personal records of altitude, distance and duration;

To furnish the Government from time to time with facts of interest and personal experiences.

Every licensed pilot in America is invited to become a member of the United States Aviation Reserve. Membership carries no further obligation than the offer of service to the United States Government in case of war. Upon enlistment the aviator will receive a certificate of membership and a gold button. Admission blanks may be obtained upon application to A. B. Lambert, St. Louis, Mo., who is the temporary chairman of the organization.

The New Wright Flying Boat.

Under the expert handling of Orville Wright, the Dean of all aviators and aeroplane construct-

ors, the new Wright flying boat made its first appearance recently on the Miami River near Dayton, Ohio, and demonstrated great efficiency and stability. With only a 60 h. p. engine this airboat lifted three and four people with ease and showed a speed of nearly 60 miles an hour. In numerous flights up and down the river the new craft displayed splendid qualities in rising from and alighting upon the water.

The hull of the new craft is made of metal and contains an engine and seats for passengers. Contrary to former practice the engine is placed low and the seats high, both being much better protected from spray and waves in this manner.

Owing to the many novel features in design and construction of the boat hull and the aeroplane wings this flying boat is capable of flying with a 60 h. p. motor, whereas most flying boats require from 70 to 100 h. p. to do the same work. A convenient starting crank is fitted back of the seat and the craft is equipped with anchor, whistle, lights and other paraphernalia, which shows a tendency toward motor boat lines. Oscar Brindley, the veteran Wright pilot, and Grover C. Loening, the Wright engineer, have also done considerable flying in this machine.

Going South for the Winter

The report is sent out from Hammondsport that at least three of the Curtiss flying boats will be seen in the South during the winter months. It is stated that C. C. Witmer is preparing to move to Miami with Mr. Harold F. McCormick's new flying boat and that Steven McGordon and William Thaw also expect to spend the winter at one of the resorts along the eastern coast of Florida. It is also said that George VonUtassy is contemplating sending his machine South as well.

The Thomas Brothers of Bath, N. Y., are making arrangements to send a flying boat South during the winter under the guidance of Walter Johnson. It is just possible that Earl Beers will also make the trip as assistant to Johnson.

Beachey Loops the Loop.

A dispatch from Los Angeles, California, under date of November 18, stated that Lincoln Beachey executed a loop the loop 2,000 feet in the air. He did other things that even he himself could not describe. One of his feats was to go 3,500 feet in the air, take a drop to within 500 feet of the ground, then turn his planes up and with this momentum describe a circle and fly along on a level, machine upside down. Then he would right his craft, make another loop and twice turn the aeroplane around on its own axis. For half an hour he kept this thing up at the North Island government flying ground, and finally landed, saying he was just experimenting and did not know what to call his tricks.

U. S. Naval Aviation Corps will Train in Cuba During the Winter

The U. S. Naval Aviation Corps, whose headquarters are at Annapolis, Md., will spend the winter in Cuba in experimental work and in the training of additional officers. The station will be under the charge of Lieutenant John H. Towers. Additional students of aviaiton who have reported are Lieutenant William McIlvain, Marine Corps; Lieutenant Richard C. Saufley and Ensign Walter D. Lamoint, of the navy.

A speedy power boat has been obtained to be used in following the flying machines. It is also an Elco hydroplane, with a 70-horsepower Curtiss motor, and is capable of thirty-two knots an hour.

The Kemp Motor

The Kemp Machine Works, of Muncie, Ind., manufacturers of the well-known Kemp air-cooled aeroplane motors, report the sale of six motors during the past month. Naturally they consider business good, in view of the fact that this time of the year is generally rather dull in aeronautic circles. In this connection the firm announces that it has secured Mr. John G. Hanna to take charge of the sales department. Mr. Hanna is well known to a large circle of aero enthusiasts, having been connected with the sport since its real beginning in this country, in 1910.

Mr. Kemp states that he regards the outlook for 1914 as very promising. The industry seems to be getting over its recent spell of depression and entering on a period of renewed and sounder, if slower, growth. The firm expects to have an eight cylinder 75 h. p. motor on the market next spring, and will then be equipped to take care of all classes of business. In this connection it is interesting to note that there has been quite a demand for their two-cylinder opposed 16-horsepower motor, the baby of the Kemp family, during the past season. It is the only motor of its size on the market, and seems to fill a long-felt want for those desiring to experiment with small, light models before building large machines. The American market, says Mr. Kemp, so long dominated exclusively by the water-cooled type, seems to be waking up to the advantage of the air coolers. It is indeed no small advantage to be able to eliminate the weight of the radiator and water, the great radiator head resistance, and the liability to water leaking or boiling away, thus permitting the motor to overheat. It is also urged by the manufacturers that more power can be obtained from the gasoline in a cylinder working at a temperature of around 350 degrees, and consequently they claim that the air-cooled motor gets more horsepower per pound of its weight, or weighs less per horsepower.

The Improved Maximotors.

From reports of the numerous Maximotor owners in the United States and abroad, Maximotor makers can justly be proud of the success their motors have met with during this last season.

Foremost amongst the numerous improvements, are a double set of ball-bearings, carrying the propeller end of the crank-shaft which are housed in a steel disk, instead of aluminum as heretofore. Both of the ball-bearings are of the annular type and besides supporting the crank-shaft, act as trust bearing as well. Arrangements are made for a double individual magneto system, also double forced-feed oil pumps and carburetor. The wrist-pins for the connecting rod bearings have been widened one-quarter of an inch, giving quite considerable more bearing surface. The crank-case received its just share of attention, being strengthened all around, especially the supporting lugs whereby the motor is fastened to engine-bed, these have been increased just double their former size and strength, forestalling a possible break-down in case of a force-landing or accident, in which the propeller is liable to come in contact with the ground or other obstructions, thereby putting a great strain on the motor support and bearings. The valve gearing also has been strengthened, and bearing surfaces increased.

Maximotor makers are at all times striving for further refinements of their already successful products. Maximotor makers have been acquiring a good deal of data of what a real motor should be composed of, these last five years, in the aeronautic motor building, and their improved overhead valve military motor is almost the last word in aeronautic motor construction.

In a three hour test by a Hydro Dynamometer, according to the builders, the motor showed in excess of 100 h. p. at 1,350 revolutions per minute, consuming 8 1-2 gallons of fuel and 7 pints of lubricating oil per hour. On the testing stand for propeller test, the motor pulled from 625 to 650 lb. thrust, turning an 8 Di. by 6 Pi. two-bladed propeller, at from 1,350 to 1,400 revolutions per minute.

Maximotor makers are now turning out the following models:

Model "A"	4-cylinder,	40-50 H. P.
Model "B"	4-cylinder,	60-70 H. P.
Model "C"	6-cylinder,	70-80 H. P.
Model "D"	6-cylinder,	90-100 H. P.

Curtiss O-X Motors in 1913.

By Lyman J. Seely.

With every American flight record of the past six months to its credit and the demand for it consistently in advance of the steadily increasing supply the Model O-X 90-100 h. p. Curtiss motor has done all and more than its designers originally expected of it. Yet only eight months ago J. H. McNamara, superintendent of the Curtiss motor factory, was explaining to Manager H. C. Genung just why he had not telegraphed to G. H. Curtiss the results of the tests he had been making with the first of these O-X motors.

McNamara had rubbed the top of his head almost bald trying to stimulate his thought to a point where it would determine for him why this remodelled 75-80 h. p. Curtiss motor, with the same old bore and stroke, practically the same weight, was showing on the standard water brake an increase of twenty-five per cent over the best it ever had done before.

"You see, Mr. Genung," he explained, "I just don't dare telegraph Mr. Curtiss what this thing does show. I've only tested her up to moderate speeds and apparently I'm getting 95 h. p. with lots in reserve. I've checked the figures backwards and forwards and tried every way to eliminate the human equation, but every time it comes back to the same thing. Either that motor's turning out better than twelve h. p. to the cylinder or I'm a Dutchman."

He delayed his report for another day or two, but the figures increased, rather than diminished, until at 1,800 r. p. m., the motor was delivering better than 106 brake h. p., and that with a brake evidently undersized for the work it had to do.

To be sure the weight had been increased by a few pounds: the new value action and increased bearing surfaces had brought the net total up to 320 pounds, and the gross total ready for a run of four hours, including gasoline, oil, radiator, water, etc., up to 638 pounds. This looked big until compared with the 4-hour running weights

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Oct. 9th 1913.

Aircraft,

New York, N. Y.

Gentlemen

Allow us to compliment your editor for the way he handles "Aircraft" and say that he has been one of the necessary lights to make aviation shine in this country. I dont believe that you realize that the fact that he has purchased a flying-boat has had as much influence here in the West as it has. Out here they are sure that the medicine is alright if the doctor will partake of it freely.

Please insert the enclosed ad in the November issue if not too late. Will use larger space later on as the season opens.

Yours respectfully,

Hamilton Aero Mfg. Co.,

Thos. F. Hamilton

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of the best of the European motors; for example, the 100 h. p. Gnome and the 70 h. p. Renault. Then the Curtiss O-X, figured at a very conservative working speed, shows its real lightness. Here is a comparative table, the figures taken from a European publication, and unchallenged so far as I know:

Motor	Weight net	Gal. Gas per hr.	Gal. Oil per hr.
100 Gnome.........	308.64	12.1675	2.7
70 Renault.........	462.966	9.26	.79
90-100 Curtiss......	430.	8.	.5

Motor	Fuel Wt. 4 hrs.	Total Wt. Motor&Fuel	Per H. P for 4 hrs
100 Gnome....	377.76 lb.	686.4 lb.	8.07 lbs.
70 Renault.....	246.03 lb.	709 lb.	9.946 lbs.
90-100 Curtiss..	208 lb.	638 lb.	7.505 lbs.

In the above table a net delivered horsepower of 85 is claimed for the 100 h. p. Gnome, the same for the O-X Curtiss and 72 for the 70 h. p. Renault. Weights for the Gnome and Renault motor fuel, etc., I have taken from the foreign publication referred to: those for the Curtiss O-X were supplied by Lieut. B. L. Smith, U. S. N., who had compiled the data from his Navy machine for his own information.

No attempt has been made this year to establish distance, duration, altitude or speed records with the Curtiss O-X motors. In the competitive events where they have been entered they have been driven hard enough to win. Beckwith Havens, for example, came through the 1,000 mile flying boat cruise from Chicago to Detroit without so much as dropping the lower half of his O-X crankcase. Even the oil with which the motor left Hammondsport was in the case until the machine reached Bay City and there one of the mechanics drained it and put in fresh oil. On the last day of the contest, after finishing an easy winner, this motor was sent in for overhauling. The same motor was used by Havens and Verplanck at the time of the celebration of the biennial of flight when they flew from Albany to New York, and back up the river to Mr. Verplanck's home at Fishkill. No breakage.

Raymond V. Morris, who acted during the summer and fall as pilot for Gerald Hanley of Providence, kept a daily record of his season's flying with the Hanley boat. His book shows a total of more than 110 flying hours, approximately 6,000 miles, with but one overhauling. Broke one rod.

C. C. Witmer, in charge of Harold F. McCormick's flying boat, has flown approximately 5,000 miles, with one overhauling of the motor. No breakage.

L. A. Vilas kept a partial record of his summer's flying from June to October, and he estimates that he flew more than 3,500 miles. So far he has not had occasion to drop the lower half of the crankcase. The motor has not been overhauled since it left the factory. No breakage.

J. A. D. McCurdy, in charge of George von Utassy's flying boat, flew every fair day from mid July to mid October. Estimated mileage 5,000. Broke one bearing cap.

Glenn L. Martin, who made some very long flights on Lake Michigan during the Great Lakes cruising contest, has used his Model O-X since early summer without sending it in for overhauling or reporting any breakage.

One of the first of the O-X motors was shipped to the U. S. Army aviation camp at San Diego on April 28th. No reports of trouble of any kind have been made to the Curtiss Company. Nor has there been any report of breakage from any of the Model O-X Curtiss motors delivered to the U. S. Navy, nor from those shipped abroad for government use.

William Thaw and W. S. MacGordon, whose flights include an aerial voyage from Newport to New York City, and whose O-X has been in constant and severe use for months, have reported neither breakage nor other trouble. At last reports the motor was said to be "pulling strong and no trouble at all."

William E. Scripps of Detroit, Barton L. Peck of Detroit, Ellwood Doherty of Buffalo, and other users of the Model O-X motors make equally favorable reports.

Both William S. Luckey and Charles F. Niles, winner and second man in the New York Aerial Derby, both used Model O-X motors. Luckey's speed over the course averaged better than 70 m. p. h., under conditions worse than ever before recorded as prevailing during a competitive event.

Thomas Brothers have used their Model O-X for exhibition flying continuously since July 21st. It was examined once but found in perfect condition and no occasion has yet been found for overhauling it.

David McCulloch, at Rio Janiero, has flown an O-X motor all summer without any trouble whatever. He has instructed a number of pupils, made numerous exhibition flights, and given the motor the test of hard everyday use.

All told nearly two score of these motors have seen the hardest sort of aviation work during the past season, and of the lot but three have suffered breakages bad enough to warrant their being sent to the factory for repairs.

PASADENA AIRSHIP BULLETIN

By ROY KNABENSHUE

The following summary of the first series of flights with my airship covers a period during which trials were made to determine how the ship might be balanced for its full passenger capacity and to observe the effect of an entirely new system of control, which has proved very efficient. The speed was from 18 to 30 miles an hour, and the flights were made in winds of 8 to 15 miles an hour. From an efficiency standpoint it is worth noting that the number of persons carried (10 at one time) with but thirty total horsepower undoubtedly excels any other passenger carrying flying either in America or abroad.

As soon as the airship was completed preliminary tests were made to try the rudders. Changes suggested themselves which brought desired results on the third test flight, and the first series of regular flights was started September 28, 1913. The series was closed on October 16, and the motor was overhauled and replaced somewhat forward of its original position, permitting the addition of another passenger compartment.

It is the intention to continue these flights, which are made on a regular schedule, during the winter from the Pasadena aerodrome. The airship has a capacity for a sustained flight of six hours; the flights thus far have varied from three to fifteen miles in length, and all were started and finished at the Pasadena aerodrome.

SUMMARY No. 1—Flights of Pasadena Airship.

Date 1913		Pilot	Assts.	Passengers	Total Carried	Duration	Remarks
Sept.	4	Knabenshue	1	1	3	10 ft.	Preliminary test.
"	20	"	1	2	4	15 ft.	Preliminary test.
"	26	"	1	1	3	18 ft.	Preliminary test.
"	28	"	1	3	5	16 ft.	Beginning first series.
"	29	"	1	3	5	12 ft.	
"	30	"	1	4	6	29 ft.	Attained speed of 30 miles an hour.
Oct.	2	"	1	5	7	20 ft.	
"	3	"	1	6	8	20 ft.	Total weights persons carried, 1420 pounds.
"	4	"	1	5	7	15 ft.	
"	5	"	1	8	10	15 ft.	
"	6	"	1	5	7	16 ft.	Includes student taking dirigible course.
"	7	"	1	5	7	10 ft.	Total number persons carried first series. 132.
"	8	"	1	4*	6	20 ft.	Total time in air, 6 hours 41 minutes.
"	9	"	1	5	7	30 ft.	
"	10	"	1	3	5	10 ft.	
"	11	"	1	5	7	42 ft.	Flight to Midwick Country Club and return.
"	12	"	1	7	9	21 ft.	
"	13	"	1	4*	6	15 ft.	
"	14	"	1	4*	6	20 ft.	
"	15	"	1	5*	7	25 ft.	
"	16	"	1	5*	7	22 ft.	

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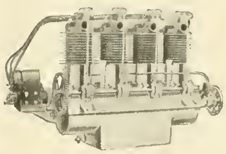
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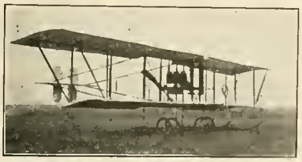
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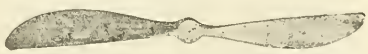
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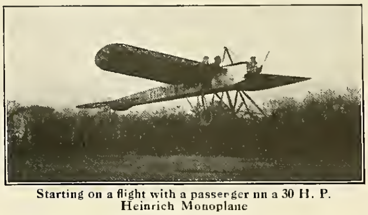

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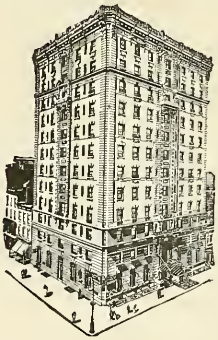

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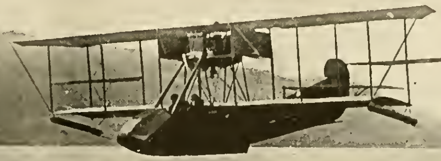

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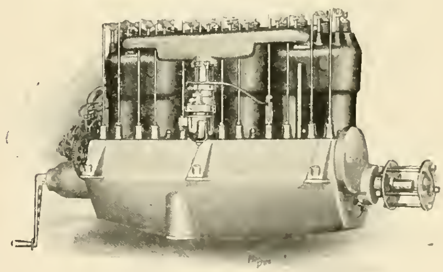

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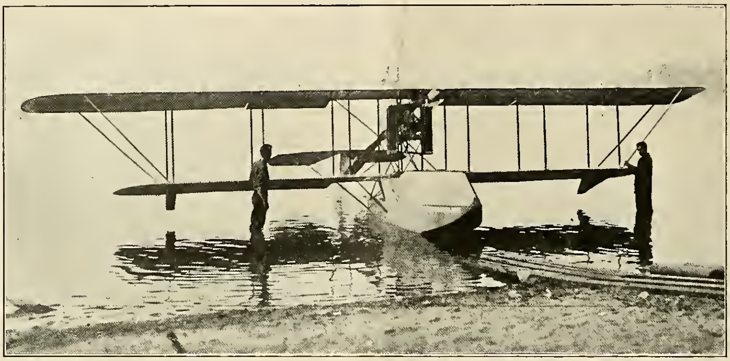

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IF YOU SEE IT IN AIRCRAFT—IT IS. IF YOU DO NOT SEE IT IN AIRCRAFT—IT IS NOT.

AIRCRAFT

Vol. 4 No. 11 JANUARY, 1914 25 Cents a Copy

SUNRISE AT HEMPSTEAD PLAINS AVIATION FIELD

This Picture shows how the alert photographer caught Albert Heinrich in his early morning act of dodging among the clouds. Mr. Heinrich, as well as the students of the Heinrich School, can be seen almost any morning or evening doing aerial stunts at the Hempstead Plains Aviation Field.

SLOANE

MANUFACTURES THE BEST AND MOST RELIABLE AEROPLANES IN AMERICA

November AIRCRAFT says: John Guy Gilpatric just starting his flight around New York City in the Aerial Derby in his new 50 H. P. Gnome motored Sloane-Deperdussin monoplane. Gilpatric's flight was probably the most remarkable one of the race for the reason that he was using a very light machine which made it more difficult to navigate through the very heavy winds encountered, and it speaks well for our American manufacturers of monoplanes in that the machine had only been flown for a few minutes previous to entering the race.

Gilpatric flew the above machine in the Times Aerial Derby without any adjustments after it left our factory and with less than five minutes' trial in the air

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FLYING-BOATS for sportsmen both monoplane and biplane types
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Robert G. Fowler—big, handsome, intelligent Bob—the man who flew across the American Continent twice—first from California to Florida and second from the Atlantic to the Pacific across the Isthmus of Panama—is shown here seated in his tractor biplane ready to put himself and machine to a useful task. Fowler has become an air-line patrolman for the Great Western Power Company of California and he and R. S. Kitto, who occupies the passenger seat, have been making daily trips of inspection over the lines of that company with considerable success.

CONTENTS—JANUARY, 1914

AIRCRAFT

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are now prepared to deliver

THE NEW WRIGHT AEROBOAT MODEL "G"

equipped with twin screws, driven by the new Wright six cylinder 60 H. P. motor, fitted with muffler and electric starter.

This craft is the development of years of careful experiment and combines in its novel form the best practice in hydro-aeroplane and flying boat work. The dangerous features of the flying boat—lack of safety in flying, shipping of water and foundering in a rough sea, addition of weight, due to water soaking, the presence of the motor unprotected over the heads of the passengers, and the drag and unseaworthiness of the long fuselage hull, have been eliminated.

The structural details of the new machine are worked out to combine simplicity, strength and reliability.

The craft is perfectly adapted to the use of sportsmen as a machine for comfort and safe travel over water at high speed.

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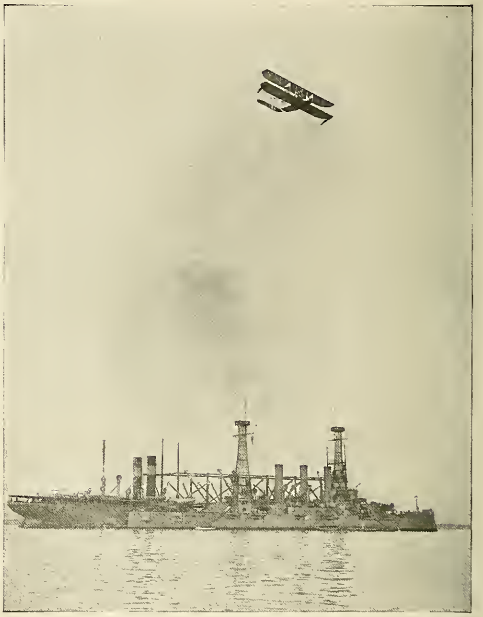

Lieut. Alfred A. Cunningham, U. S. M. C. flying over the battleship "Connecticut" in a Burgess Hydro-Aeroplane equipped with

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AIRCRAFT

Vol. 4 No. 11 NEW YORK, JANUARY, 1914 25 CENTS A COPY $2.00 A YEAR

THE NEW WRIGHT FLYING BOAT

By HENRY WILLIAMS

ANOTHER step in the development of a safe and useful marine flying machine, which the Wright Company has been at work on for over two years, is shown in the new Wright aeroboat, pictures of which were shown in the December AIRCRAFT as well as additional photos and drawings herewith.

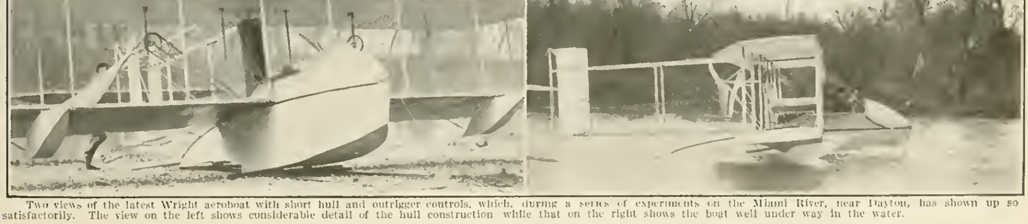
It has been an accepted principle in the development work at Dayton and one which in the work of the past year has proven entirely correct, that flying boats as a type were poor flyers, and therefore, were restricted to fairly heavy water work, in which good flying was not required, and that hydro-aeroplanes, which could be made good flyers were not applicable to rough water work. Outside of the general experimental work that has been carried on the past few years, a short while ago, a type of aeroplanes, equipped with pontoons, type "C-H" was developed at Dayton, which was practically a perfect flyer, and was adapted to use in shallow water. It was natural therefore that the next step in the development should be a type of craft which not only was adapted to shallow water and was a good flyer, but which was also adapted to rough water and the use that the so-called flying boats are usually put to. The attainment of this has been reached in the new Wright aeroboat, which is a marvelously good flyer, quick enough to rise off the water for use on small rivers and so constructed that it presents exceptional rough water qualities as well.

The aeroboat is naturally of considerable interest, as it is a development of a long series of experiments and represents a great amount of thought. The craft was designed by Grover C. Loening under the direction of Mr. Orville Wright, and not only combines the vast experience of the Wright Company in its flying qualities, but in the aeroboat portion, Mr. Loening has applied many of the important features which were worked out in his early experiments on aeroboats. It will be remembered that in 1911 and 1912, Mr. Loening did a great deal of original work with flying boats.

The excellent flying characteristics of the new type are primarily due to a better co-ordination of aeroplane surfaces, and rudders and the closer proximity of the line of thrust to the center of weight. In addition the form of the boat hull has been studied so that air pressures on it would add to the natural stability of the machine instead of detracting therefrom, as is done by the hull fuselage combination in the flying boat type. The usual two propeller Wright system is, of course, adhered to, as the stability and efficiency this system gives to the aeroplane have been proven invaluable.

As a machine for the use of sportsmen, the new Wright aeroboat not only offers a marine aeroplane that is seaworthy, but enables the sportsmen to enjoy flying, because of the safety of the machine, and because of its splendid balance and control in the air.

The Wright aeroboat may briefly be described, therefore, as a step in which hydro-aeroplane and flying boat characteristics have been altered into a new type. The machine consists of two distinct parts: the boat hull containing the seats and motor, to which is rigidly attached the aeroplane structure, consisting of wings and rudders. The two seats side by side are placed in front of the main surfaces, the motor is set below and behind them, and drives two propellers in the customary Wright fashion. The aeroplane



Two views of the latest Wright aeroboat with short hull and outrigger controls, which, during a series of experiments on the Miami River, near Dayton, has shown up so satisfactorily. The view on the left shows considerable detail of the hull construction while that on the right shows the boat well under way in the water.

and rudder details are quite similar to the standard Wright type "C," excepting that the strut arrangement is altered, and due to the concentration of the load at the center, the wiring and joints have necessarily been made of much larger and stronger section. The span of the surfaces is 38 feet, the chord is 6 feet, and the total lifting surface is 432 sq. ft. The propellers are 8½ ft. in diameter, and are driven by the motor at 600 r.p.m. The elevator which is raised to the center line of the propellers is 48 sq. ft. in area, and with the large type "C" rudder, and the enormous transverse control that is given by the warping system, the control in the air of this machine is more powerful than on other marine aeroplanes.

Perhaps the most interesting part of the machine is the boat hull itself, which is of novel construction and which inaugurates a new type of craft. The hull is made of special metal alloy, treated so as to prevent corrosion by salt water, and more nearly approaches in its hydroplaning qualities, good practice of motor boat work than has previously been done. The hydroplaning part of the hull consists virtually of two hydroplane surfaces, both presenting their most efficient angle to the water at the same time that there is given the best lifting angle of the planes, and the best line of thrust of the propellers. The rear plane has been studied with extreme care, as the angle of this plane for its highest efficiency requires consideration of the wave thrown back from the front hydroplane surface.

The hull is 3 ft. deep, 18 ft. long and 43 in. wide. The weight of the hull fully equipped is 300 pounds. This includes the motor bed and seats, dash board, etc. Its strength is not only due to its compact form, but due to the manner in which the frame work in back of the metal has been designed is enormous. The hull is divided into six entirely water-tight compartments and is water-tight throughout. The motor and seats being set above the top of the water-tight portion, so that the hull itself is really in this sense a pontoon. There is no possibility therefore of shipping water and adding to the weight of the machine.

The arrangement of the seats and controls is exceedingly neat, and effective, and approaches in appearance, as well as comfort, to automobile practice. The engine is operated entirely by foot throttle combined with a throttle lever exactly as on motor cars. A dash board is fitted on which the instruments are placed, and back of the hood, conveniently at hand, are a klaxon horn, priming can, starting crank, anchor and anchor rope. The anchor rope is passed out through a port in the extreme bow of the machine, a very neat detail, which makes anchoring easy, and quick of operation. The starting mechanism consists merely of a safety starter, geared up from the motor. The handle is inserted on the auxiliary shaft back of the seats, and is easily turned with one hand. The motor is very accessible from the seats, even permitting of replacing spark plugs while in flight and of easy inspection. Being at the rear, the noise and exhaust are entirely away from the operator. A small flag is fitted at the bow to indicate, as in usual Wright practice, the least tendency of the machine to skid.

The manner in which the seats are closed in, the form of the hood, and the neat side doors and steps fitted, make the entire arrangement not only finished in appearance, but perfect in protection against air and waves.

The form of the hull when hydroplaning is such that practically no spray is thrown, and even in rough weather riding in the machine is "dry."

The total weight of the aeroboat ready for flight is 1,200 pounds. The live load that has been carried in the tests at Dayton has amounted to practically 600 pounds, making the total load in flight, 1,800 pounds.

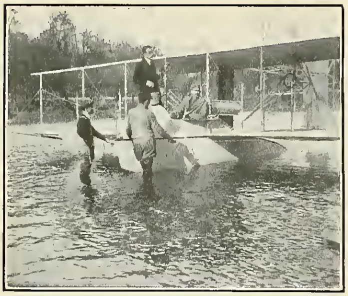
This machine is equipped with a six cylinder, 60 H.P. Wright motor, which gives 30 pounds carried per horse power, the highest figure yet attained in marine aeroplane work.

The machine has a speed range of 36 to 60 miles an hour, and a climbing rate far in excess of what has previously been obtained. The performances of this machine with only a 60 H.P. engine are a striking illustration of the efficiency of the Wright type aeroplane.

In addition to the main center pontoon, two auxiliary pontoons are fitted. These are also made of metal, weighing 11 pounds apiece, and are of a form which insures the correction of the balance of the machine with the least amount of drag, a feature which for rough water work is of the utmost importance.

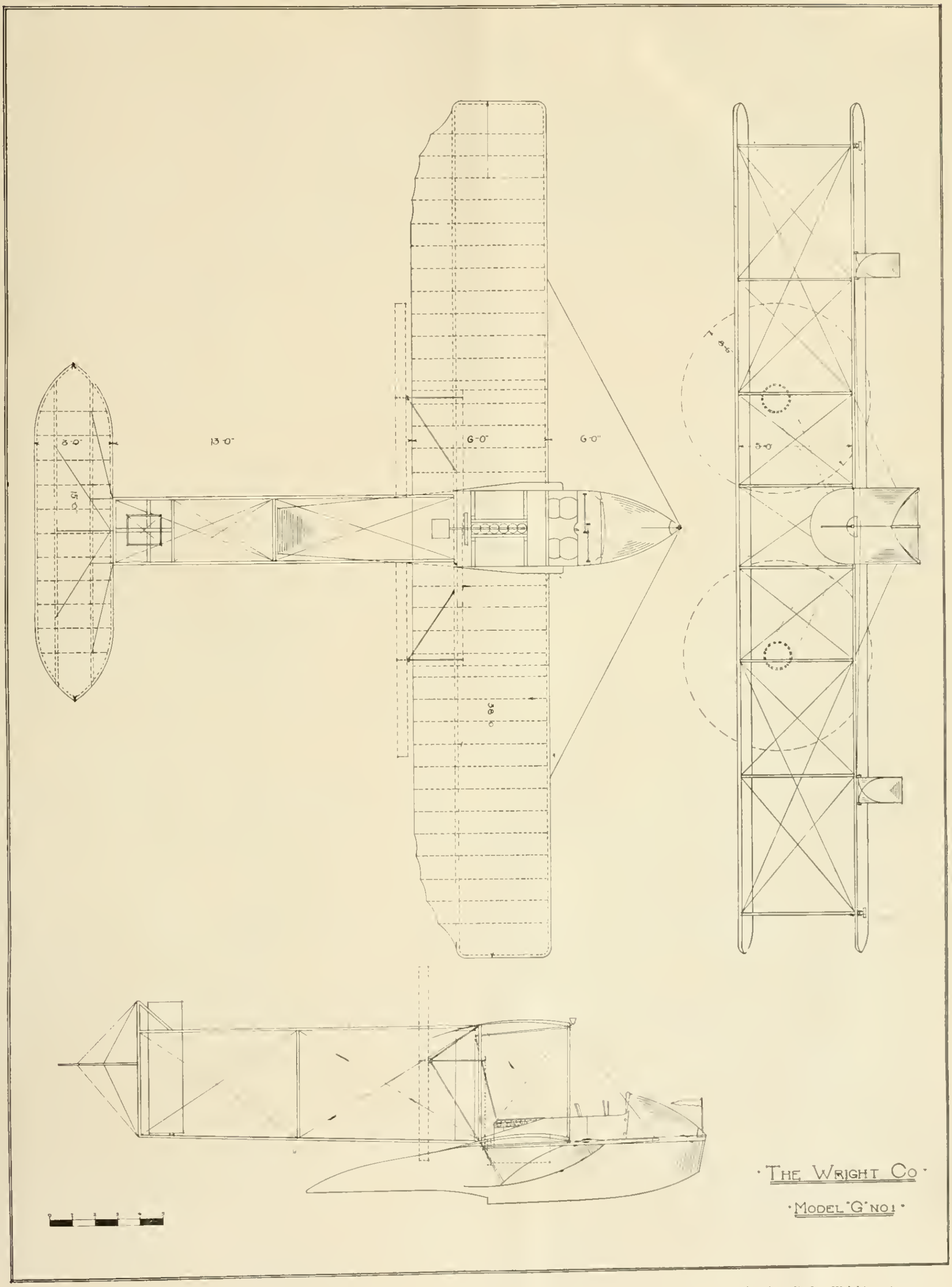
The control of the craft on the water is done entirely by the side paddle system, used by Grover C. Loening in his early aeroboat experiments. This method of control is more effective than a water rudder, and turns the machine at high speed in any kind of wind.

As a complete machine the Wright aeroboat is singularly graceful and compact, and represents a new type of craft which is bound to have a promising future, not only as a means of sport, but as a useful machine for high speed travel over water.



Three views of the latest type Wright aeroboat. In the first picture Orville Wright, the peer of all aviators, either in America or in foreign countries, and who is constantly flying and experimenting with flying machines, can be seen seated at the controls while the boat is at rest in shallow water. In the middle picture Oscar Brindley is giving an excellent performance in flying among the trees which line the banks of the Miami River, where the boat is undergoing a series of tests. The third picture shows Brindley, accompanied by Grover C. Loening, doing some hydroplaning work along the narrow and winding river course, which proves the adaptability of this sort of craft for small or shallow rivers as well as their utilization to fly over and upon the deep seas. The tests already made show that the 60 horsepower Wright six-cylinder motor installed drives the aeroboat along at the rate of 60 miles an hour, that the boat will carry two persons and several hours' supply of gas and oil, that it can be controlled in choppy winds practically as readily as a land machine and that in rising from the water fully loaded, from a position at rest, a run of only 200 or 300 feet is necessary.

SCALE DRAWINGS OF THE LATEST TYPE WRIGHT AEROBOAT



Side, top and plan views of the new Wright, short-hulled, flying boat with outrigger controls, which is fitted with a 60 H. P. six-cylinder Wright motor.

G. Lee Temple, first English airman to fly upside down.

Foreign News

BY

Arthur V. Prescott

Africa

The aviation centre of Kassar-Said, Tunis, Lieut. Reimbert in command, boasts an escadrille of six H. Farman biplanes with two additional machines in reserve, and in response to a request from the General Officer Commanding in Tunis, the French Minister of War has consented to add another hangar and two biplanes to the station.

England

Some very fine flying has been seen at Brooklands recently. Mr. Hawker on one occasion took out the third of the Sopwith machines built for the army and carried three passengers weighing 150 pounds each to a height of 1,000 feet which was reached in 3 mins. 40 secs. This was done as a test of the climbing capacity of the machine.

Mr. Barnwell, piloting the Martinsyde, has also been giving splendid passenger carrying demonstrations.

LEWIS AEROPLANE GUN SUCCESSFULLY TESTED.

The Lewis automatic rapid firing aeroplane gun, recently adopted by Great Britain, as reported in the December AIRCRAFT, has been successfully tested at the Bisley Range. Lieut. Stellingwelf, of the Belgian Army, fired it from a Grahame-White biplane traveling at a rate of 50 miles an hour and sent eleven bullets out of fourteen into a thirty-foot target from a height of 400 feet. The ease with which he sprinkled the target with shot and the fact that the gun demonstrated it could fire 500 shots a minute without difficulty created a distinct impression. The British War Office has taken over a preliminary consignment of the new weapons.

54 YEARS OF AGE QUALIFIES FOR LICENSE.

That youth is not an absolute essential for the making of a successful aeroplane pilot is borne out by the fact of Commander Mansfield Cummings, R. N., a gentleman of 54, having recently qualified for his pilot's certificate on a M. Farman biplane, at Étampes, France.

CAPT. LONGCROFT'S LONG FLIGHT.

Probably the finest flight with passenger yet made in the world was that of Capt. Longcroft on November 22, when, accompanied by Lieut.-Col. Sykes, he flew on biplane BE 218 from Montrose to Portsmouth, and then to Farnborough, the distance of 630 miles taking 7¼ hrs. The machine, which was fitted with a special petrol tank of 54 gallons capacity, left Montrose at 8.55 a. m., and landed at Farnborough at 4.10 p. m. It will be remembered that Capt. Longcroft previously held the world's record for a flight in a straight line with a passenger with 288.6 miles.

McCLEAN'S NEW HYDRO-AEROPLANE.

A new four-seater waterplane has just been built by Messrs. Short Bros. for Mr. F. K. McClean, who intends to take the machine to Egypt, and in company with Mr. Alec Ogilvie and a mechanic make an expedition along the Nile. On November 19th Mr. McClean made a test flight along the Kent coast, taking up four passengers, Commander Samson, Lieut. Courtney, Mr. Ogilvie and Mr. Short. The machine has a speed of about 72 m.p.h.

A NEW BRISTOL WATERPLANE.

Tests have been made at Pembroke Dock with a new machine built by the Bristol Co., and which is specially intended for ocean work. The machine has a deep keel and there are also two propellers, one being for the purpose of driving the machine along the surface of the sea.

A REAL NAVY HEAD.

The First Lord of the Admiralty recently paid a visit to Central Flying School at Upavon, where at his request every officer at the school, including instructors and pupils, was introduced to him. Having inspected the sheds and workshops, Mr. Churchill then made a flight as passenger with Major Gerrard, R.M.L.I. The First Lord has now flown at every Naval Air Station where machines were available, as well as at the Naval Flying School at Eastchurch and at the partially naval Central Flying School. He has also flown in the French dirigible owned by the Navy and in two of the British-built dirigibles which it was intended that the Navy should take over. There only remains for him the experience of a trip in the German Parseval when she is again inflated and a descent by parachute. It is reported on fairly good authority that in future Mr. Churchill intends to devote a considerably increased amount of his time at the Admiralty every day exclusively to aerial defence.

NEW ENGLISH FLYING BOAT CONCERN.

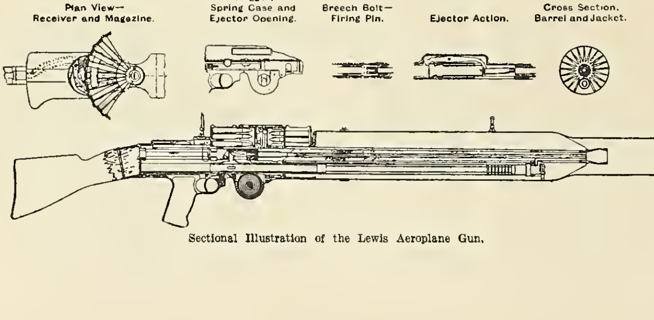
A new flying boat concern under the name of the Franco-British Aviation Company, was introduced during the past month to various people interested in aviation at a lunch given by the directors of the firm. Col. de Salis was in the chair, and, in a brief speech, said that the company had been formed primarily with the idea of producing the best possible hydro-aeroplane for the services of England and France. The technical managers of the firm are Lieut. Jean de Conneau, better known perhaps as M. Beaumont, winner of the *Daily Mail* Circuit, and M. Louis Schreck, who will be remembered as participating in the first aviation meeting ever held in England, namely, that at Doncaster in 1909. The firm's works are at present in France at Vernon (Eure), where M. Schreck is in control. One gathers that the company is at present backed by M. Tailliez, who not long ago purchased the famous Tellier business, which is noted for its racing boats and hydro-aeroplane floats. With so much technical experience behind it the company ought to be able to produce machines as good as any on the market.

It already possesses all the patents and designs of the L'Evéque and Artois flying-boats together with the manufacturing rights for the Curtiss boats in France, so that it has good designs to start on. If it can do sufficient business with these while it is developing bigger machines for rough sea work, such as all navies must demand in the near future, it should have excellent prospects of success.

WINS BRITISH MICHELIN PRIZE OF $2,500.

The Michelin Cup was won on November 6th by Mr. Reginald Carr flying a 100 H.P. Green-motored Grahame-White biplane. Starting from the Hendon aerodrome at 8 a. m. he made 15 complete circuits of the Hendon-Brooklands course, with a stop at each third round, three calls being made at Brooklands and two at Hendon. On his sixteenth round after leaving Brooklands, Mr. Carr ran into a thick fog and was obliged to alight. A distance of 315 miles was covered and a passenger carried.

It is interesting to note that although as personal mechanic to Mr. Grahame-White during the past four years, Mr. Carr only came out as a pilot during 1913. He is noted as an expert engine tuner and has contributed largely to the success of England's aerobus constructor.



Sectional Illustration of the Lewis Aeroplane Gun.

France

VEDRINES FLIES FROM NANCY TO PRAGUE.

After the little contretemps which occurred at Nancy about a month ago, little has been heard of Jules Vedrines, but on November 19th he left Nancy on his Blériot machine, accompanied by his mechanic. His destination was kept secret until the last moment, although it was known that he had been endeavoring to secure permission to fly across Germany. This had been refused, but it eventually proved that, entirely undaunted, Vedrines had flown right across Germany without a stop and landed at Wyotschau, close to Prague in Bohemia, having covered a distance of 650 kiloms. in 6 hrs. 20 mins. On the following day he flew on to Vienna, taking 3½ hrs. for the distance of 300 kiloms. Vedrines has stated that he intends to fly on to Constantinople and from there continue his journey either down to Ceylon or to Lake Chad in the Soudan. Vedrines' two-seater Blériot has an 80 h.p. Gnome motor and Integral propeller.

PARIS TO BORDEAUX AND BACK.

In an attempt to beat Seguin's record for the Ae.C.F. Criterium, Gilbert, on his Morane-Saulnier monoplane, left Villacoublay on the 20th inst. He had to land at Pauillac, after flying round and round in the fog for nearly an hour. Later, he went on to Bordeaux, and the following day he succeeded in flying the 500 kiloms. back to Paris in 3 hrs. 35 mins., including a 20 min. stop at Poitiers.

MORE LOOPING THE LOOP.

On a Caudron biplane fitted with 60 h.p. Gnome engine, Chanteloup gave a most extraordinary display of flying at Issy recently, and subsequently at Juvisy he looped the loop several times, made several horizontal circles in the air with the planes practically vertical, and also carried out the corkscrew twist.

At Villacoublay, Garros succeeded in looping the loop on the Morane machine on which he crossed the Mediterranean. On his first trial the machine was stalled just before completing the loop, and side-slipped for a considerable distance, but Garros was able to regain the control. On the second attempt, however, two perfect circles were made.

THE NEW LEWIS QUICK-FIRING RIFLE-FIELD-GUN FOR AEROPLANES

(Courtesy Illustrated London News)

THE WEAPON USED ON THE GROUND TRYING TO HIT AN AEROPLANE WITH THE LEWIS AIR-COOLED MACHINE GUN

TO SHOW THE WEAPON'S MOBILITY TWO GUNS AND A TRIPOD CARRIED BY THREE MEN

FOR TWO GUNS AND TWO HUNDRED ROUNDS OF AMMUNITION A PONY OUTFIT OF THE LEWIS AIR-COOLED MACHINE-GUN

EXAMINING THE GROUND-TARGET AFTER THE FLYING [illegible] ELEVEN TIMES OUT OF FOURTEEN SHOTS FROM A HEIGHT [illegible] ABOUT [illegible] FEET

FIRING THE GUN FROM ITS TRIPOD SERGEANT OMMUNDSEN A KING'S PRIZE-WINNER TESTING THE WEAPON

TO SHOW THE POSITIONS OF THE GUNNER AND THE PILOT. THE GUN MOUNTED ON A [illegible]-H.P. GRAHAME-WHITE BIPLANE.

Tests were carried out recently at Bisley, England, with the new Lewis Air-cooled Machine-Gun, the invention of Colonel I. N. Lewis, U. S. A. (retired). The weapon claims to have the mobility of the rifle with something of the destructiveness of the field-gun. Its weight is 26½ lbs. It was fixed for the experiments to a Grahame-White biplane, piloted by Marcus D. Manton, with Lieut. Stellingwerf, of the Belgian Army seated beneath the pilot as gunner. From a height of about 400 feet, and at an angle of about 50 degrees, the gunner hit a white target 30 feet square, eleven times out of fourteen shots fired in rapid succession. The gun was also tested on the ground, at 200 and 500 yards. In the rapidity tests at the latter distance, a marksman hit the target with 282 out of 470 shots. The weapon has a normal rapidity of firing of 500 rounds a minute, with absence of appreciable recoil, and air-cooling so effective that it ca be fired continuously without over-heating.

On November 23rd, Pegoud gave a demonstration at Munich, while Hanouille did some looping on his Blériot at Buc.

AN INVOLUNTARY LOOPING.

While making an attempt at Etampes on the height record Rost had a most exciting few moments. He had got to a height of about 4,500 metres, when he found the wind took the machine out of his control. The machine dived, and according to an eyewitness it somersaulted about twenty times. Fortunately after the machine had dropped in this way for about 3,000 metres, the pilot never having lost his head, no doubt through the lessons taught by Pegoud, was able to regain control, and managed to effect a safe landing.

FLIES FROM FRANCE TO CORSICA.

A very fine flight was recently made by Lieut. Delage of the French Navy, who piloted a Nieuport hydro from St. Raphael, France, to Ajaccio in Corsica, a distance of about 160 miles.

The municipal Council of Limoges, sitting under the presidency of the Mayor, has voted a sum of $10,000 for the purchase of sufficient ground to form an aerodrome for military purposes.

CONTEST FOR $100,000 PRIZE FOR A SAFE AEROPLANE.

Entries close on January 1st for the big prize of 500,000 francs offered by the Union pour la Securité en Aeroplane for the best device attached to a heavier-than-air machine which will promote safety in flight or in alighting, or for the aeroplane as a whole which is considered the safest machine. This prize was announced last summer, and it is the biggest prize yet offered for the development of the safe aeroplane. Inventors will not be required to demonstrate their machines or devices for a couple of months after the closing date of entries. An entrance fee of $40 is required, together with a complete description of the apparatus and an option in favor of the French government for the period of a few months.

Germany

GERMANY'S METHOD OF ACQUIRING EFFICIENT PILOTS.

A large number of German military pilots are trained by aeroplane constructors by arrangement with the government. For each pilot the government allows the constructor $2,500 which includes all breakages. Out of this sum the manufacturer has to pay for the pupil's board. The pupil receives $25 a month in addition to his pay throughout the term of the flying course. In this way Germany has formed a very efficient and large aviation corps.

INTERESTING RECORD OF THE CRUISER "HANSA'S" WORK.

The Zeppelin passenger carrying dirigible "Hansa" has just completed its three hundredth tour having been in continuous service for 15 months. This cruiser has now covered 21,300 miles in a total of 6,402 hours and has carried 6,337 passengers in all, or an average of 21 per trip.

A record of flights made for one single month at the Johannisthal flying field, near Berlin, shows the remarkable number of 4,732 ascents made by 162 aviators, the duration of the flights totalling 500 hours in all.

WITH PASSENGER FLIES 372 MILES.

On November 22, Lieut. Geyer and a passenger flew from Strasburg to Berlin—372 miles—in 4 hrs. 22 mins.

AIRSHIPS TO FLY IMPERIAL WAR FLAG.

By order of the Emperor the Army airships will fly in future the Imperial War Flag, hitherto permitted only to men-of-war, naval forts and naval officers.

THE NEW ZEPPELIN ON TRIAL.

The latest Zeppelin dirigible, "Z22," left Friedrichschafen at 8 a. m. on November 22nd with a military commission on board, and arrived at Gotha at 1.15 p. m. The vessel will be put through her official trials at Gotha.

Italy

About the beginning of the month Captain La Polla was engaged in flying a 70-h.p. Renault-M. Farman from Pordenone to Rome via Ancona, Foggia, Naples, about 680 miles. Though several times obliged to come down and wait for fog to disperse, he arrived at Naples, his native city, in good time. Here he stopped to exhibit before embarking on the last part—i.e., Naples-Rome—a stage which has become in one short year merely not worth recording.

Japan

Six aeroplanes took part in the annual manoeuvres of the Japanese Army which was held last month. This is the first time that aeroplanes have been so employed in this country.

Russia

GRANT OF THIRTY-SIX MILLIONS FOR AERONAUTICAL SERVICES.

Official announcements state that the Douma has made a grant of 36,000,000 rubles for aeronautical services to be extended over a period of three years. Machines numbering 1,000 are understood to be on order for delivery by 1916 and all are to be Russian built. The present Russian military aerial force is 360 aeroplanes and 12 dirigibles.

Roumania

An order for four tractor biplanes has been placed by the Minister of War with an English firm.

Spain

AEROPLANES IN WARFARE.

Two of the Spanish military pilots owe their promotion to their bravery under fire. Capt. Barreiro and Lieut. Rios were making a reconnaissance over a Moorish encampment, when the Moors opened fire. Both officers were seriously wounded, but they succeeded in getting back to their base and then collapsed. They were taken to hospital and the commander recommended them for promotion for their bravery and endurance.

A SUGGESTED DESIGN FOR A MILITARY MONOPLANE
"CLEAR-VIEW TYPE"

By PAUL J. PALMER

The monoplane, for its size and area, is conceded among the aviation devotees as being the most efficient and speediest type of aeroplane, and in Military Aviation, speed and efficiency are of absolute necessity.

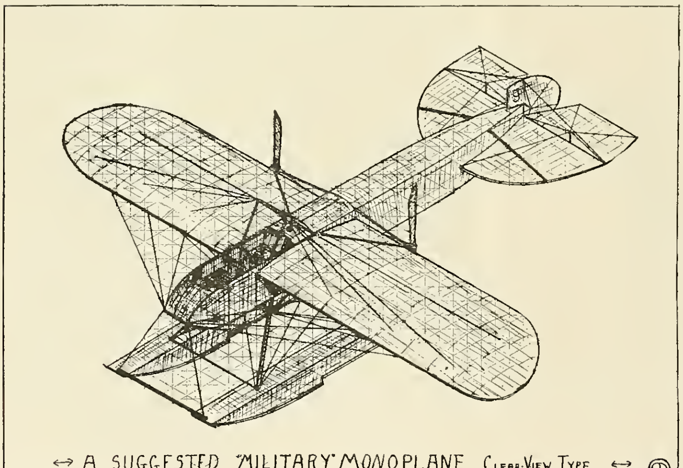
In Military Aviation the principal use of an aeroplane is in "scouting," and the view obtainable therefrom must cover as wide a field as possible. In the present type of monoplane, with the motor in front and the occupants in the rear, the planes cut off a great portion of the view, and even if transparent surfaces are used, the view obtained through them is clouded and affected. When biplanes of the "Motor-behind" type are used, the observer has little difficulty in obtaining an excellent view of very large proportions.

In this design the speed and efficiency of the monoplane is retained, together with the unobstructed observation qualities of the biplane.

In the suggested design, the motor is entirely housed, and in case of "buckin-up-agin-a" rain or snow storm, the motor and its accessories would not likely be affected by getting wet. Another advantage of the design is that the occupants are not affected by the propeller-draught, which, in a Gnome-driven tractor plane, unless the motor is protected, gives a person an oil-bath, and makes him the sole beneficiary of the exhaust gases.

GENERAL DIMENSIONS.

Span, 35 feet, chord, 6 feet 8 inches. Angle of incidence of main planes, 5.6°; weight, 750 pounds; passenger capacity, 2. Area of main planes, 180 square feet. Lift at six pounds per square foot, 1,100 pounds. Length, over all, 27 feet 6 inches. Speed, 60 to 75 miles per hour. Horse power, 60-100. Two propellers. Lateral control, warp. Method of control. Deperdussin.



↔ A SUGGESTED "MILITARY" MONOPLANE CLEAR-VIEW TYPE. ↔

PLANES.

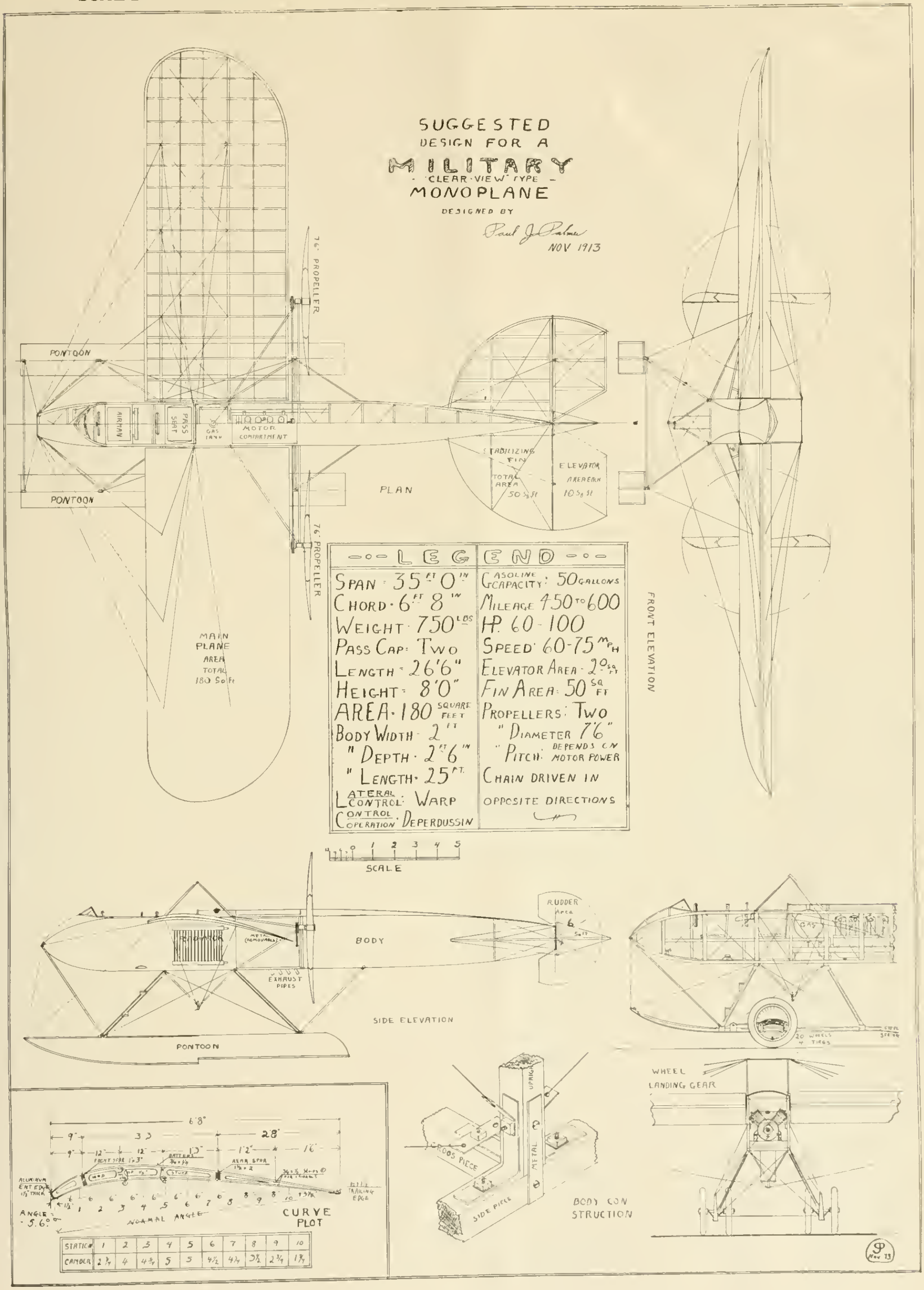
The main planes are each 16′ 6″ in length, 6′ 8″ chord, with a maximum camber of 5″ and maximum thickness of 5″. The general shape is similar to the well-known and efficient Blériot surface. The front longitudinal spar is 1 x 3, of spruce or ash, either laminated, solid, or hollow. The ribs are built up as shown, of a ½″ thick sawed-out web, with spruce battens ¼ x ¾ glued to the web, making an I-beam and spaced on 12″ centers. The entering edge is formed of sheet aluminum, while the trailing edge is of ½ x 1½ spruce. In constructing the ribs, would advise the constructor not to cut the slots for the spars and strips until after the rib is put together. If cut out before, the ribs are very hard to put together properly. Across the planes are strips of ¾ x ¼ spruce, fitted between the battens of the ribs, as shown. The purpose of these strips is to aid in retaining the cloth in a taut condition. The planes can be wired and cross-braced internally for added strength. All wood work should be covered with spar varnish to protect it from the destructive action of the elements. The surfacing material should be of the best grade of rubberized cloth, or cloth treated with a proofing material. Thin metal strips or tape could be used in fastening the cloth to the ribs to prevent the fastenings from tearing through the cloth in case of sudden stresses occurring. The front spar fits into a socket located on an upright member of the fuselage, while the rear spar is bolted with a single heavy bolt to an upright. This gives a hinge-action enabling the warp to operate easily.

FUSELAGE.

The fuselage to be built up of ash or spruce members, cross-braced and trussed, after the customary method of fuselage construction. The length is 25′; width, 2′, depth, 2′ 6″, outside measurements. The side members to be of 1 x 1½, cross members on the bottom, 1 x 1½, uprights, except at the plane attaching points and engine-bed supports, to be of the same dimensions. The uprights at the plane connection and engine-bed points to be of 1 x 3. The cross pieces on the top of the fuselage are to be cut out to a circular form to give to the "deck" an arched form as shown in the drawings. These could be ¾ inch thick. The fuselage to be covered in entirely by cloth, thin wood planking, or, in case of a plane used in warfare, armor plated at the essential points. If cloth is used, thin battens will be required on the upper deck to retain the arched shape.

The gas and oil tanks are located just aft the center of pressure, and are of 50 gallons of gasoline and 15 gallons of oil capacity. The airman and observer are located forward of the center of pressure to counterbalance the weight of the

SCALE DRAWINGS OF A SUGGESTED DESIGN FOR A MILITARY MONOPLANE



motor and equipment. The seats could be upholstered for comfort, and numerous conveniences installed.

The compartment for the motor is metal covered, the sides and deck being removable as in automobile hood construction.

LANDING GEAR AND PONTOONS.

If used as a land machine, double wheels and skids could be attached as shown. This type of landing gear is very strong, light and simple, and will withstand very hard usage. Wheels and axles to be connected to the skids by radius-rods and rubber-shock-absorbers as shown. Steel tubing or ash members could be used for the struts. All to be guy-wired securely.

If pontoons are fitted they should be built as strong and light as possible. The dimensions are 15′ length; 18″ beam; 15″ depth forward of step and 12″ depth back of step; the step located approximately under the center of gravity and pressure. Constructed in the usual rib-and-plank method, covered with canvas. Pontoons connected to fuselage by steel tubing or ash struts and trussed.

CONTROLS.

The warp is especially adaptable to the monoplane, is more than twice as efficient as ailerons or wing tips, and owing to the difficulty of bracing the planes, is easily applied to the plane. The Deperdussin method of control, where the warp is operated by turning the handwheel towards the high side, is suggested.

The elevating planes are of 20 sq. ft. total area, work in unison; are built up of ½ x 1½ spruce strips, and are controlled by the for'n'aft movement of the Deperdussin control yoke. They are of the shape shown.

The rudder is semi-circular, of 6 sq. ft. area, built up of ½ x 1½ spruce strips, and is controlled by the foot yoke. Can be operated directly as on the Deperdussin or indirectly as on the Blériot, i.e.: Can be operated by pushing the right foot in the direction of the inner side of the curve, or by the left foot in the direction of the inner side of the curve.

Dual control is advised, enabling either airman to assume control in flight. This is also a valuable feature for training-machines. All control wires to pass through Bowden wire turns and friction-points, and to be doubled for safety.

PROPULSION.

The motor to be of the water-cooled vertical or V type, of 60 or more horse power. Mounted on oak or ash engine-bed timbers as shown. For convenience in starting a mechanical self-starter could be fitted, and a disengaging clutch would be handy for "lettin' 'er roar" without the neighboring populace playing "tug-o-war" with the "boid." The exhaust could be easily muffled before being carried outside the fuselage by the exhaust pipes. The radiators are of the old Antoinette type, and are placed alongside the fuselage.

Two propellers are suggested, being supported by a tubing arrangement as shown. It is well known that two propellers are far more efficient in power consumption than a single one. The gyroscopic action is rendered nil; the revolutions of the propeller are cut down, reducing the tendency of the blade to fly apart due to the terrific centrifugal force at high rotative speeds. The propellers could be geared down 1:2. Greater speed with less horse power can be obtained by the use of two propellers. The propellers could be driven either by the conventional chain type of apparatus, or by bevel gears. They should rotate in opposite directions. If the machine is to be used as a hydro, the propeller tips should be protected by metal sleeves to prevent splitting by "the sad sea waves."

REPORT ON AVIATION IN THE UNITED STATES NAVY

By Captain W. I. CHAMBERS, U. S. N. (Retired).

The principal interests of the year in the development of naval aviation have centered in the use of the "flying boat" and the establishment in the country of a national aeronautical laboratory. The success of the former seems practically assured and will greatly facilitate the investigations of the latter.

Up to the present time the Navy has seven flying boats: five Curtiss and two Burgess, and will acquire others as soon as modifications now in sight result in improved stability and greater lightness of hull. The craftsmanship of the scientific boat builder is now required to decrease the weight while improving the strength and seakeeping qualities, and experiments are under way looking to the more extensive use of a suitable metal in the hull construction.

Instruction has been carried on satisfactorily at the aviation camp, Annapolis, Md., and great credit is due to Lieut. John H. Towers, U. S. N., in charge of the camp, for his competent management, under difficulties, and to the other officers and men detailed to the camp, for their zeal and devotion to the work.

During the last week of December, 1912, the camp was transferred to Guantanamo, Cuba, where in addition to the regular work of instruction some very satisfactory tests, bearing upon the problems of naval operations, were carried out in the presence of the Atlantic Fleet and a wide range of estimates of the future usefulness of aeroplanes in naval warfare was obtained. The main idea governing the selection of this location for the camp was to familiarize the officers and men of the fleet with the peculiarities of the machines and to enable as many as could be spared to obtain instruction. Most of those who took flights, however, did so during the hours of recreation and an opportunity was thus offered to test the desirability of those most interested for special instruction as aviators.

Up to August 1st, 1913, 2,118 flights had been made and 1,470 passengers carried for purposes of instruction or observation. That represented 502 hours of flight corresponding to a distance of about 27,097 miles covered. The 14 qualified aviators had up to that time been in the air either in control or as passengers for a total of 653 hours. Two hundred and forty officers have taken flights of instruction or observation in addition to their other duties. Furthermore, 266 flights have been given to petty officers and enlisted men at the camp, some of long duration, and 130 flights have been given to distinguished citizens interested in aerial navigation.

The records of machines in air to August 1, 1913, stand as follows:

A1—Curtiss hydroaeroplane, accepted July, 1911	54 hrs.	47 mins.
A2—Curtiss aeroplane, converted to hydro, accepted July, 1911	130	2
A3—Curtiss hydroaeroplane, accepted October, 1912	97	24
B1—Wright aeroplane, converted to hydro, accepted July, 1911	94	17
B2—Wright type, built as hydro by Navy October, 1912	49	62
C1—Curtiss flying boat, accepted December, 1912	62	52
D1—Burgess flying boat, accepted May, 1913	8	23
	497	58

(This report was prepared on July 30 in order to have it ready by August 1st. Since then, four flying boats have been acquired (3 Curtiss and 1 Burgess) and four additional officers have been ordered to instruction. One officer has been detached).

It has been our constant policy to avoid sensational feats having no experimental value; but several notable altitude, distance and endurance flights have been made to test the capacities of the machines, the reliability of the motors, the efficiency of instruments and the navigating skill of the aviators. After the return of the camp to Annapolis, at the end of March, 1913, weekly flights across Chesapeake Bay and along its shores were inaugurated, resulting in a great increase of interest and information.

The machines show improvement in respect to motor reliability, but they are still lacking in rugged characteristics. The success of the aviator depends greatly upon his intelligent care and his attention to the details of motor repair.

Hyroaeroplane A1, originally fitted with a Curtiss 8-cylinder 50 horse power motor, was later fitted with a similar motor of 75 horse power. Being the first machine, it received a great deal of rough handling and many repairs. It was in this machine that Lieut. Ellyson successfully demonstrated the practicability of starting in flight over a taut wire cable, such as may be readily stretched for the purpose on any large ship; and in this machine he made a flight with Lieut. Towers from Annapolis, Md., to Fort Monroe, Va., and return on his own resources.

Hydroaeroplane A2, originally fitted for land service only, has had two Curtiss 8-cylinder motors, the latest being the model OX, which is good for a steady 80 horse power, and for 100 horse power at intervals. It is good for continuous flight at 60 miles per hour. In this machine several practical moonlight flights have been made by Lieut. Towers, and in it he accomplished his endurance record of 6 hrs. 35 mins. 10 secs. at 1,500 feet on October 6, 1912, which yet remains the world's endurance record for hydroaeroplanes and the American endurance record for any aeroplane.

A-2 has been converted into an experimental machine (E-1), called the "O W L boat" (Over Water and Land), which is a type very desirable for Navy work. It was first tried in September, when it attained a speed range of 44 to 65 miles per hour.

Its distinguishing characteristics are (1) efficiency as a sturdy land machine with resilient land gear, enough weight or power of endurance being sacrificed to provide efficiency as a water machine; (2) improved handiness and efficiency as a water machine and the possibility of eliminating the weight of wheel gear for extended flight over water exclusively.

With the first hastily built model, Lieutenant Smith, U.S.M.C., who had never flown in a land machine before, negotiated 11 landings and ascents on shore with great ease, some of them with a 200 lb. passenger, and was pleased with the manoeuvring qualities. This was done before the characteristics of the Wright "Aeroboat" were known, and it is anticipated that the latter will be equipped as an O W L boat, with wheels, to rival the performances of E-1.

Hydroaeroplane A3, originally fitted with a Curtiss 75 horse power motor, is now fitted with a Curtiss model OX of 80-100 horse power. It was in this machine that Lieut. Ellyson was successfully launched from the "catapult" starting device on November 12, 1912, and that Lieut. P. N. L. Bellinger made a flight to an altitude of 6,200 feet, on June 13, 1913, to test its climbing capacity.

Hydroaeroplane B1, the first Wright machine, was originally fitted for land service only, was later fitted with Burgess double pontoons, was used in experimenting with other types of pontoons, and finally gave greatest satisfaction with the single pontoon and balancing floats. Several valuable tests of different type motors have been made in this machine and it is now fitted with a satisfactory motor of the Sturtevant type. Several tests of wireless apparatus have been made with this machine and its most notable flight was that of Lieut. John Rodgers, from Annapolis, to Washington, D. C., thence to College Park, Md., thence to Annapolis, via Havre de Grace, Md.

Hydroaeroplane B2, Wright type, made at the aviation camp from spare parts, was fitted with a very satisfactory 6-cylinder Curtiss motor of 50-60 horse power and Curtiss hydroplane. Several notable moonlight and other flights have been made in it by Ensign V. D. Herbster, and his altitude flight of 4,450 feet, with passenger, on April 24, 1913, showed its climbing and manoeuvering power to advantage. It was specially strengthened by extra wires and other devices, which probably saved it from collapse in falling from an altitude of 1,600 feet during the lamentable flight on June 20, 1913, when Lieut. Billingsley was thrown out. It is possible to repair this machine, but it is not considered best to do so, in view of a more desirable type intended for its replacement.

Flying boat C1, the first of the Curtiss type, has given satisfaction. Its motor, originally of 75 horse power, has been replaced by a Curtiss model OX, 80-100 horse power. In this machine Lieut. Towers and Ensign G. D. C. Chevalier flew from Guantanamo to Santiago de Cuba, on March 10, 1913, in 46 minutes, at an altitude of 1,950 feet, returning next day at an altitude of 2,700 feet, in 77 minutes against strong winds. Its measured speed is 60.53 miles per hour. These two officers also flew in this machine from Washington, D. C., to Annapolis, on May 9, 1913, over the river and bay (171 miles), in 185 minutes, at an altitude of 1,500 to 2,200 feet, and on May 20, from Annapolis to Cambridge, Md., and return in 88 minutes, at an altitude of 2,350 feet. The same flight was repeated on June 3, 1913, to Chestertown, Md. (59 miles), at an altitude of 2,525 feet; and Ensign Chevalier, with Second Lieut. B. L. Smith, also flew in this machine from Annapolis, Md., to Fort Monroe, Va., on July 23, returning on July 27, 1913. On December 17, 1912, Lieut. Ellyson was successfully launched in this machine from the "catapult" starting device at the navy yard, Washington, D. C.

Flying boat D1 is a newly purchased machine of the Burgess type, fitted with a 75-horsepower Renault air-cooled motor, the comparative tests of which will be watched with interest, as this motor has a fine European reputation for reliability.

OTHER TESTS AND RESEARCHES.

The "catapult," or starting device, successfully tested at the navy yard, Washington, D. C., in November and December, 1912, was made of improvised materials. A new catapult designed on the same principles, but with certain improvements suggested by the first trials, is being manufactured for test on one of the ships of the fleet at a convenient opportunity.

An improvised Sperry gyroscopic automatic stabilizer has been purchased and fitted to a new Curtiss flying boat (to be designated C2) and is being systematically tested over Lake Keuka, N. Y., where a new fast motor boat of the Elco type (fitted with the 6-cylinder motor of the wrecked hydroaeroplane B2) has been provided for attendance on the flights. This motor boat will be used later at the aviation camp at Annapolis.

Attention is now focused on the undesirability of having two different types of control in use and the importance of adopting a single standard. For the purpose of selecting this standard in a systematic, scientific, yet practical way, an apparatus is being rigged at the navy yard, Washington, D. C., by which it is expected to settle this vexed question, for the Navy at least, in a thorough manner with the assistance of the aviators. The problem is of great importance and of world-wide interest.

The investigation of models for flying boats and hydroaeroplanes has progressed continuously at the model basin, whenever opportunity has served, under the able direction of Naval Constructor H. C. Richardson, United States Navy, and a vast amount of useful information has been obtained concerning the location and effects of steps and ventilating tubes, the influence of form at high speeds, the evolution of a hull of best all-round efficiency and the diving effects of hulls in common use.

Efforts are being made to test improvements suggested by our own aviators and the latest developments abroad in respect to the arrangement and shape of wing surfaces, by the use of power-driven models. Efforts are also being made to equip a full-sized machine specially for research work in co-operation with developments planned by the Langley Aerodynamic Laboratory.

MODEL DEPARTMENT

By NICHOLAS S. SCHLOEDER

The Killing of the Goose That Laid the Golden Eggs

Most of us have heard the fable of a certain goose, owned by a peasant, which, each day, laid a golden egg, bringing great prosperity to its owner; how, one day, the peasant, coming to the conclusion that an animal capable of laying so many golden eggs, must contain within it untold wealth, seized it and killed it in an endeavor to see what was inside, with the result that he was not only to be disappointed by finding nothing, but the goose, being dead, could lay no more eggs. From this little fable we are able to draw an analogy to apply to the aeronautical world. The goose is represented by model flying in general, the peasant by the commercial interests that have grown around it.

It was not long after the beginning of model flying before it was seen that models offered a new field for business. This was not only perfectly legitimate, but beneficial as well, placing it as it did alongside of recognized sports. For a time there was perfect harmony. Models were huge and clumsy affairs, and bolts, screws, fittings, etc., of all kinds were in order, all furnishing material for dealers to supply. But model flying was in its infancy and like all infants who develop so rapidly that there is constant need for new clothing, it soon showed changes that were viewed with dismay by the dealers in supplies. Models growing simpler and more scientific all these numerous appliances were discarded. Catalogues were out of date before they were issued.

A number of those who represented the business interests, finding that they had not met the requirements of model flying, attempted to mold conditions to suit themselves, a very destructive thing to any sport. This led to the ever widening of the breach between those foremost in model circles and the commercial branch of the sport, till the mere fact that a model flyer purchased goods from supply houses was evidence enough that he was a beginner in this art. To any other than the stickler for the benefit of good morals, the practice of selling obsolete and utterly inferior models to newcomers who bought with the desire to win contests would have been nobody's business, but these people did not stop here; but belittled the value of racing models, which did seriously concern us. What has been the result of this policy? It is a well-known fact that in England to-day the sport has advanced far beyond the point reached in this country. There it is a sport of men as well as of boys. Wm. P. Dean, the pioneer English model flyer, in a recent letter, tells us that he was much disappointed when he found that in this country models were considered as toys for the play of boys. In England it is not an uncommon sight to see a group of middle aged men competing with each other in a contest.

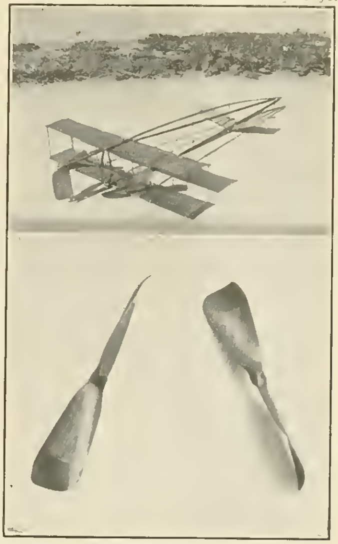
There are other causes for the sterile condition of model flying in America. A few of those who represented the commercial side, held themselves forth as leading authorities on the subject among those connected with full-sized machines, who took them at their word with a resultant loss of respect for model flyers in general. Then there is a tendency on the part of publishers to regard models as primarily for children. Another thing detrimental to this science has been the exorbitant prices charged for many things. Most record holders of the past two years have been built at a cost anywhere from 25 cents to a dollar, depending on the amount of work that the maker did himself. This is a prevailing opinion among model flyers. Thus we find that the Philadelphia M. A. A. urges that one of the advantages to be derived from membership is the fact that supplies can be had at "sensible prices."

It is a remarkable fact that model aeronautics seems to hold the interest of its devotees longer than most other activities. Most of those who entered the sport at the beginning are still interested, or at least would be if they could. There is a lot of room for development in this country. There is no reason why business should not be conducted on a quantity basis, and if they will only let the goose wax strong and wait for the golden eggs to pile up, instead of crushing it at the start, it will be found that there will be greater prosperity for all in question. What has been done in England ought to be accomplished in this country.

It is hoped that the day when newcomers were wont to appear on the field of contest with a "scientific" Bleriot, whose center of gravity was near the tail, is over.

The C. O. XII Biplane

This biplane model built more than two years ago by Charles V. Obst, president of the L. I. M. A. C., has made records which have not as yet been surpassed by a model of this class. It has repeatedly exceeded the mark of 1,100 feet in distance and about 48 seconds in duration. It is stable and fast, besides attaining good altitudes in its flight, which, considering the fact that it has been driven by only seven strands of rubber, much less than the usual number used in a monoplane model of the same size, shows that it is a very efficient flyer.



The upper photograph shows the Obst biplane model in flight and the lower two model propellers constructed by William P. Dean.

The main planes measure 18 inches by 3 inches, with a ¼ inch camber, each consisting of 2 bamboo spars running lengthwise and 5 bamboo ribs spaced 4½ inches apart. Bamboo paper, treated with shellac, is the covering. The planes are separated by ten uprights of bamboo 3½ inches high. The elevator measures 9 inches by 2 inches with two spars and four ribs made and covered in the same manner as the large planes. The elevation is given to it by the curvature of the fuselage to which it is attached. It has a dihedral angle of 160 degrees. A fin, 3 inches high by 2½ inches, attached to the end of the fuselage by a piece of rubber to permit adjustment acts as a rudder, which is both efficient and quick acting.

The fuselage is 33 inches long, consisting of two pieces, of ⅛ by 3/16 inch oak, tapering at the rear, joined together in front, 3½ inches apart at the rear, placed contrary to the usual method directly over each other. Four upright struts separate the fuselage sticks. Two additional upright struts support a crosspiece which holds the propeller bearings. The wings are fastened to the fuselage top and bottom by rubber. These arrangements are clearly shown in the illustration. All joints are bound and glued. The frame is shellacked.

The propellers are carved out of white pine, 7¼ inches in length, 14 inches pitch, with a blade area of 2 2/5 square inches, and a ⅛ inch cup. They are driven at twelve hundred R. P. M. [illegible] motors consisting of 8 strands each, giving a 2½ ounce thrust. The shafts consist of 1/16 inch steel rod fitted with thread and brass nuts turning in a brass collar.

The total weight is 4½ ounces. The feature of the model is its originality.

Model Notes

A new club, the Philadelphia Model Aero Association, has recently been organized in that city. The following were elected as officers of the club: President, J. S. Owens; vice-president, G. Tattersfield; secretary and treasurer, C. E. Jenkins. A small magazine is published by one of its members, Wm. J. Hewitt, called the Model Aero Quarterly. The club's first contest was held on October 17, 1913, at 69th and Market Streets. The winner was Gerald Tattersfield, whose single propeller model made a flight of 54 seconds. Mr. Tattersfield sends a long and interesting letter. He writes in part: "AIRCRAFT is certainly the best magazine of its purpose in this country and its model department ranks high. However, if the space could be spared, I think it would be a vast improvement to include a model diary. . . . Model aeronautics in America appears to be confined entirely to a few places. From magazine accounts, New York and its vicinity, Chicago and San Francisco appear to be the only places where real flying occurs. While I realize that accounts of small clubs similar to ours is not interesting to the record holders, yet I think that the publication of these would encourage and promote model aeronautics in America, by encouraging the small clubs to do better instead of aweing them by 'enormous' distances and durations."

AIRCRAFT has always been ready to give space to small clubs, but, unfortunately, it is too true that model aeronautics is confined to a few places. AIRCRAFT invites all who think they hold a record to send it in, with a brief description of the model, nature of the ground, etc. The conditions under which they are accepted as official are as follows: It must either be made in a bona fide contest for a prize, and be attested to by witnesses; or, in lieu of this, it must be subscribed to before a notary public. This is for the ultimate benefit of all.

The single tractor record is held by Mr. A Cruver, of the Illinois Model Aero Club, with 54 seconds.

REVIEW OF RECENT AERONAUTIC PATENTS

By LESTER L. SARGENT

Aeronautic patents have been granted during the past month to the following inventors:

Sir Hiram S. Maxim, of Streatham, London, England (Assignor to Vickers, Ltd., of Westminster, England) Bombs for Use with Aeroplanes and other Flying Machines. Patent Nos. 1,078,298, 1,078,989, 1,077,990.

These bombs, designed for use with aircraft—flying machines or balloons—have a detonating charge retained in a position remote from the main charge until the bomb is discharged or released. Their distinguished inventor, who has long been engaged in the art of promoting peace by making war more terrible, provides an impacting part or "pilot" located at a predetermined distance in advance of the bomb, which is connected with the detonating charge, and sets it off. This in turn explodes the main charge at a predetermined distance above or from the ground, object or target after impact with the latter of the impacting part. The shell or casing of the bombs is provided with grooves in which are metal fragments or balls, with high explosive interspersed, to cause the explosion to afford the highest degree of destruction whether of life or property, as earth works, forts or other erections. A parachute device may be employed in connection with the bomb, and which is adapted to retain the detonating charge in the inoperative position until such release is effected.

This inventor's patent 1,077,989 relates especially to means for securing the bomb with its axial line in the direction of motion of the flying machine and to cause it to descend nearly vertically after release. In manipulating the bomb, the aviator will first examine his barometer to ascertain the height he has attained from the earth. Then by means of a geometrical instrument comprising a sector, suitably marked to denote feet, yards, etc., and a radial pivotally-mounted sighting arm and a pointer attached to it, he ascertains the position from which he can

discharge the bomb so as to insure its reaching the target. By moving the pointer to the graduation or figure on the sector denoting the height from the earth and by sighting the target along the radial sighting arm the aim is taken. When the desired position is reached during the travel or movement of the aeroplane, the bomb is released from the machine by means of a lever, and the bomb travels along the trajectory in a more or less curved track, first with the speed of the machine, but shortly it commences to fall rapidly and the concussion takes place at a point in close proximity to that to which the sighting line was directed. A slow burning fuse may be arranged to be set off by the detonator when it is desired to afford the aviator more time to get out of the danger zone before the main charge is fired or exploded.

James A. Moore, of Detroit, Michigan, inventor of an Apparatus for Controlling Aeroplanes. Patented November 11, 1913. No. 1,078,300.

This is a device for maintaining the equilibrium of aeroplanes. A pendulum is operatively connected with a rotating cylinder divided into equal compartments and into this cylinder a supply pipe from a source of compressed air—a pump or reservoir—supplies compressed air to the cylinder. Should the aeroplane tilt to one side the weight turns about a pivot relative to the aeroplane and causes the cylinder to tilt in the reverse direction so that apertures in the cylinder register with the supply pipe, admit compressed air to one of the chambers of the cylinder, thus moving the piston, and warping the planes by drawing in cords operatively connected with their tips, and thus restore the horizontal position of the aeroplane. When the aeroplane is horizontal the supply is halfway between the two ports and the cylinder chamber is closed to the supply of air under pressure, and the piston is stationary.

William S. Hull, of Jackson, Mississippi, inventor of a Flying Machine. Patented November 11, 1913. Patent 1,078,143.

This invention relates to a lifting device for flying machines, and comprises a plurality of planes having an oscillatory and reciprocatory movement obtained by attaching each end of the plane to the arms of cranks, which when in motion are rotated in opposite directions in order to produce a motion to the planes which will obtain a lifting and sustaining action upon the air. The lift is effected by operating by direct pressure upon the air, as does the wing of a bird, thus providing more direct proportional resistance than any kind of a propellor. Of course a propellor is also employed as an adjunct of the machine.

Adolf Donath, of New York City, inventor of Aeronautical Apparatus, patented November 18, 1913. Patent 1,078,614.

This is a type of aircraft adapted to be lifted as a whole or in part by a lighter than air gas such as hydrogen, and it has propellors mounted so as to drive the air downwardly. The machine is approximately cigar-shaped, save that in cross-section it presents a triangular appearance with a convex bottom portion of greater area than the upper part. The outershell is divided into compartments for various inner gas bags. The engine is centrally located and drives lifting propellors positioned above it, and an independent propulsive propellor.

Brutus Brooks, of Martin, Tenn., inventor of an Aeroplane, patented November 18, 1913. Patent 1,078,713.

This invention is particularly intended to maintain the lateral balance of aeroplanes. It utilizes extension wings in lieu of the usual ailerons. These wings are designed to fold backwardly automatically while the machine is in flight and thus reduce the surface exposed to the action of the air and, consequently, permit greater speed than would otherwise be possible. The vertical rudder is connected with the balancing devices so as to work in unison with them. The balancing wings at the sides of the sustaining plane are each made up of a series of interfitting sections pivotally mounted at their front ends. Springs hold the wings normally extended and spaced apart. The sections are mounted to nest together when subjected to excessive air resistance.

Theodore Windel, of Brooklyn, N. Y., inventor of an Automatic Stabilizer for Aeroplanes, patented November 18, 1913. Patent 1,078,888.

The invention comprises a plane member, of suitable contour, pivotally supported on a flying machine in such manner that the pressure represented by a certain velocity of movement through the atmosphere will actuate this plane to direct that movement of the machine in one angle, while the pressure represented by a different velocity will direct the movement of the machine in a different angle. To the pair of elevator members provided for the aeroplane, there are added pivoted supports arranged obliquely at opposite equal angles. The inclination of these supports is upwardly inward with respect to the supporting plane. Each of the supports has a pressure influenced projection to turn them. A connecting spring tends to restrain the pivoted supports.

Rudolph G. Dressler, of Coney Island, N. Y., inventor of an Aerodrome, patented November 18, 1913. Patent 1,079,167.

There is one claim, as follows: "In an aerodrome, an elongated frame, a helm, a rudder thereon, having horizontal and vertical planes, an intermediate lever slidably and pivotally connected at its rear end to said helm, a handle lever slidably and pivotally connected at its rear end to said intermediate lever, and supports to which said helm and levers are pivoted by universal joint connections, whereby the rudder may be moved in any direction."

George E. Hanes, of Denver, Colo., inventor of an Aeroplane, patented November 18, 1913. Patent 1,079,171.

The prime object of this inventor is the quick restoring of the balance or equilibrium to an aero plane at any time. A plane is provided formed with a plurality of independent sections arranged in the same horizontal plane. Stiffening ribs, a depending frame work and the necessary guy ropes are also provided. Pivotally mounted centrally of the planes is a journal shaft which carries the frame-work, including the driving mechanism, operator's seat, skids, etc., including adjustable mechanism engaging the framework depending from the planes whereby the incidence of the planes may be varied, by means of sidewise tilting of such stabilizing planes.

John Menzl and Elmer Burdg, of Dayton Ohio, joint inventors of a Flying Machine, patented November 25, 1913. Patent 1,079,508.

This is a substantially circular aeroplane. Propellors are mounted at the front and rear ends of the plane. A carriage depends from and is pivotally connected directly to the frame on a transverse axis whereby the plane and carriage may have longitudinal swinging movements relative to each other. A connection between the carriage and the rudder causes the automatic shifting of the rudder upon movement of the carriage.

Samuel E. Bailey, of Scranton, Pa., inventor of a Hydroplane, patented December 2, 1913. Patent 1,080,407.

This hydroplane has means for the control of the air planes and water planes so that they may interact for assisting each other. Stationary lifting planes are provided in combination with lifting propellors and movable or adjustable lifting and guiding planes. A speed-changing device is provided for causing the prime mover to move the propellors at varying speeds as occasion may require, the propellors being associated with lifting and guiding planes so that the adjustability of the speed of the propellors is utilized.

Samuel L. Buchanan, of Valparaiso, Ind., inventor of a Flying Machine, patented December 2, 1913. Patent 1,080,195.

This invention relates primarily to improved guiding mechanism for aircraft—either biplanes or monoplanes. It comprises a vertical rudder extending forward of its axis, a horizontal rudder at each side of the vertical rudder, and a shaft on which the horizontal rudders are mounted. This shaft is connected by arms, rods, pulleys and cords with a pendulum shaft intermediately pivoted to turn on a horizontal axis, the cords being attached respectively above and below the axis. Opposite arms on the shaft, cords and pulleys operatively connect the shaft with the front end of the vertical rudder.

NEWS IN GENERAL

By D. E. BALL

California News

By R. H. Blanquie.

Now that the winter months are drawing near many aviators have come to California to spend the season where their flying won't be impeded by inclement weather. Some have gone to the southern part of the State, to Los Angeles or San Diego, while others, mostly the hydro-aeroplanists, have come to San Francisco whose splendid and immense bay offers numberless ideal places for practising flying above water.

To be counted among the well-known aviators actually in the vicinity of San Francisco, are Roy Francis, Bob Fowler, Silas and Otto Christofferson, James Blakely, Frank Bryant and others, all piloting some sort of water air craft.

The Panama-Pacific International Exposition Committee has recently inaugurated a program for each Sunday and holiday, consisting of exhibition hydro-aeroplane flights in which take part most of the above mentioned airmen. These exhibitions are held on the beach of the Fair Grounds which offers a very suitable place for the starting and landing of airboats. Large crowds are attracted each time who for a small charge, besides viewing the water planes, have the privilege of inspecting thoroughly the constructional progress of the Exposition. Many interesting features are given each time in the line of spectacular and novel flying. Silas Christofferson in his Curtiss type hydro-aeroplane, has succeeded by imitating perfectly Lincoln Beachey's famous "death dip," which he daringly and brilliantly performs at the close of each program. To do this he rises to a height of about 2,000 feet then shuts off his engine and swoops nose downward, almost vertically, at a terrific speed and before striking water regains gradually his former stability and alights gracefully. In one of the recent exhibitions the same aviator "pulled off" a new stunt, quite original. While he was in the air one of his mechanics was rowed out a short distance and jumped overboard and thereupon feigned the part of a drowning person. His employer immediately took the part of the rescuer and came down from above. Standing on the pontoon of his craft he grappled his man by the collar with one hand and with the other adroitly steered his machine safely to the beach amidst the applause of the spectators.

It is sad to note the retirement from aviation of Adolph Sutro, who had gained much renown as a hydro-aeroplane pilot of considerable merit. During his aeronautical career he has accomplished many excellent flights and had, but a short time ago, broken some records. Recently at one of the Exposition exhibitions he had a narrow escape. While descending too abruptly his machine struck violently the water and plunged, burying himself and his passenger under the wreckage in the bay. Since that unfortunate accident his parents have succeeded in dissuading him to drop the flying game, much to the regret of all the local followers of aviation.

Otto Rybitski came near being the victim, not long ago, of a vandal who sought his destruction in the most villainous of ways. Fortunately the aviator discovered in time that the safety wires of his machine were cut and the turnbuckles unscrewed. Rybitski is an airman of several years' experience and came to San Francisco, where he has been doing excellent flying, direct from Germany.

J. B. Struble, a San Francisco business man, is the next about to join the ranks of the modern aerial commuters. He intends to fly daily from Oakland, his home city, on the opposite side of the bay, across to his place of business. Struble is having the Christofferson Aviation Co. build his airboat and expects to commute aerially within a month.

The first of the duo of hydro-aeroplanes ordered by Roald Amundsen, the noted polar explorer, from the Christoffersons for his North Pole expedition in 1914, is now ready and will undergo tests immediately. The other one is rapidly nearing completion.

After having acquired much fame by accomplishing various sorts of acrobatic feats in an aeroplane and retiring temporarily, fortune made, Lincoln Beachey has returned to the flying game with the firm intention of duplicating and outdoing, if possible, Pegoud's and Chevillard's mode of flying. He is actually at North Island, San Diego, where he is practising intently new foolhardy stunts to feed to the public. One of his latest performances has been termed by other aviators "the Beachy bore." He does this by flying downwards vertically and causing the aeroplane to spin several times like a top in its rapid descent. On Nov. 27th at the Coronado Polo Grounds before 12,000 spectators, he succeeded in making the triple loop from a height of 3,000 feet. In regards to accident in which Lieuts. Kelly and Ellington were killed at San Diego, Lincoln Beachey declared:

"The death of Kelly and Ellington at San Diego is the result of forcing officers to fly in antiquated machines.

"For the past two weeks I have been with the signal corps and know the equipment is a disgrace for the most prosperous nation on earth. I have telegraphed my views to Secretary of War Garrison and Secretary of the Navy Daniels."

John Hoffman, the constructor of a novel monoplane, mentioned in a previous numoer of AIRCRAFT, met with ill luck while trying out his invention at Sausalito. After having flown most satisfactorily for about thirty minutes a stiff wind rose and caused the plane to strike the water and damage itself to some extent but luckily incurred no injury to its pilot who is not dismayed in the least by his bit of bad luck.

Bob Fowler, best known for his transcontinental flight from Los Angeles to Jacksonville, has signed a contract with the Great Western Power Co. of California to fly with a lineman twice a week over the company's high-power lines from Oakland to Sacramento, a distance of 74 miles. Till now when a break occurred in the wires it took much delay and expense in locating the damage. Now the aerial patrol has triumphantly supplanted the former patrol of linemen by being able to accomplish same work more effectively and economically from every angle. When a break is noticed a landing is made nearby and the lineman gets off and repairs same immediately. On Dec. 4th, the second flight was made and the officers of the company announced their satisfaction of new service.

Seattle News

By Paul J. Palmer

Mr. Frank Bryant left, November 17th, for San Francisco where he will give, together with other airmen, Sunday matinees at the 1915 Exposition

Grounds. Mr. Bryant has changed over to a Farman control. He formerly used a three-in-one.

Mrs. Alys-McKee Bryant has finished her motographic exhibition flights.

Capt. J. V. Martin and his wife, who is also a flyer, have gone to San Francisco for the winter. Further plans unannounced.

About all left here now are the fledglings, and the "rocking-chair hexpoits."

To Raviate:

Wifie: John, our French bull pup snapped at the cook to-day.

Hubby: Well, don't she look like a German dirigible?

Pennsylvania News

By W. H. Sheahan.

The Aero Club of Pennsylvania made what will probably be its last balloon ascension for the season of 1913. On November 5th the Club's large balloon "Pennsylvania I," left the Holmesburg field in the early afternoon and made a landing but twenty-five minutes later in Medford, N. J., a distance of twenty-five miles. The distance between the two points being covered at aeroplane speed of a mile a minute.

President Wynne of the Aero Club acted as pilot with Dr. Jerome Kingsbury and T. H. Bridgeman of New York as passengers. In the balloon's quick rise, due to the high winds, a lamp post was struck and knocked over and several electric light wires and the roof of a building grazed. At times pilot and passengers were obliged to cling tightly to the basket owing to the lurching.

Upon making a safe landing at Medford, Mr. Wynne who has had a great deal of experience in aeroplaning as well as ballooning, expressed his opinion that the trip was one of the fastest air voyages he had ever made.

November 23rd Grover Bergdoll, made a series of six fine flights in his Wright machine, over Eagle Aviation Field, near Philadelphia. On several of his trips he was accompanied by his mechanician, Chas. Kraus, Jr., who celebrated his one hundredth flight on this date.

Quite a hard breeze was blowing but Bergdoll skilfully piloted his Wright without mishap. Bergdoll is a student in the law classes of the University of Pennsylvania and was lately elected vice-president of his class on the "good government" ticket. As a reward to his political supporter they have been promised aeroplane trips and an aeronautical organization is being formed among the students who are interested in aviation.

R. C. Jennings of Uniontown has finished his tractor biplane and successful flights of same have already been made. A four cylinder Gray Eagle motor is placed in front of the enclosed fuselage, running at 1,400 r.p.m. it drives the propeller direct. The plane is quite light, weighing but 510 lbs. equipped for flight. The upper plane is of thirty foot span, the lower plane twenty-three foot span and the chord is fifty inches. It is reported that it flies very easily with its pilot weighing nearly 160 lbs.

Dr. A. F. Zahm of Washington, on the evening of November 26th, gave an unusually interesting lecture before the Franklin Institute of Philadelphia and the Aero Club of Pennsylvania—it being the first joint meeting of the Institute and the Club.

The lecture, "Recent Developments in Aeromechanics," was well attended. Dr. Zahm gave an account of the most recent researches in aeromechanics as made in the principal European aeronautical laboratories and the application of same to aircraft design. Numerous lantern slides of interest were shown and at the close of the lecture a discussion as to the merits of certain devices was held by several prominent engineers who were present. It is announced that later in the season Lieut.-Col. Samuel Reber of the army will lecture before a similar joint meeting.

Maximotor Makers' Success

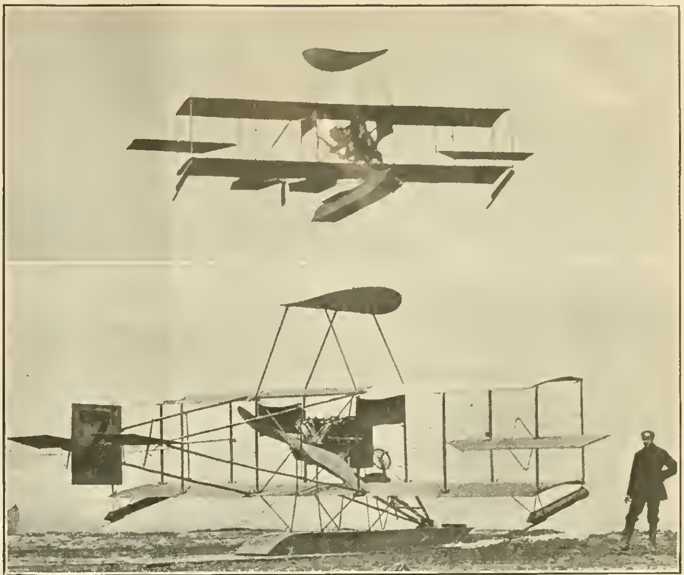
The Maximotor Makers of Detroit, Mich, report very encouraging business prospects for 1914, a large number of orders already being on hand for spring delivery. Interest has been awakened among the yachtsmen and a large fleet of flying boats is expected on the Detroit River, as a result.

Mr. N. Dingfelder of the Maximotor firm has been taken up as a passenger in a great number of flights with Messrs. Scripps and Peck in their Curtiss flying boats and hopes soon to become an active flyer.

Two flying boats are being built by this Detroit concern, one for Mr. W. Davidson of that city and another for use in demonstrating the Maximotor.

Robinson Recommends a Glue for Flying Boats

The old established firm of L. W. Ferdinand and Company of Boston, Mass., are the manufacturers, importers and exporters of glues and cements for all purposes. Their Waterproof Liquid Glue for use in combination with canvas, is especially to be recommended and is used extensively by leading manufacturers of flying boats. Hugh L. Robinson, in a recent letter to this concern says: "I wish to say that I have always used your Jeffery's Marine Glue in the construction of boats, etc., and have never been able to find another glue which would give the entire satisfaction that it does. In the construction of the hull of the Benoist Flying Boats which I designed and built, I always use Jeffery's Marine Glue exclusively and they are a marvel of strength and lightness and never leak or take water in the least."



The above photographsshow the new device for stabilizing aeroplanes invented by H. C. Fiske, of Stafford, Conn. It consists of a disk of canvas 7 ft. in diameter with the sides curved upwards 10 ins. from the horizontal at the extremities. The device weighs 11 lbs. and the form and method of mounting it is plainly shown in the photographs. William S. Luckey recently tried it out in a number of trial flights in which he declared it to be very satisfactory. He states that he found under medium speed the aeroplane was very steady without using the ailerons and that it was also effective at high speeds in straight flights and medium large circles. He also stated that the machine banked and handled very nicely in calm air and in a wind of 30 miles velocity. The curve of the stabilizer is such that if the machine starts to drop sidewise the air banking up against the lower side of the disk will bring it back to level. When making a turn the machine banks automatically, for the lateral drift due to centrifugal action brings air pressure against the side of the disk and causes the plane to lift on the outer end. The lower picture shows a Curtiss hydroaeroplane fitted with a disk stabilizer, while the upper picture shows it in flight without using the ailerons.

The various products of the L. W. Ferdinand Company are so well known that they may be obtained at all yacht, boat and canoe supply houses, but requests made direct to them at Boston for samples and price lists are solicited.

American Rights for Dunne Machine obtained by Burgess Company and Curtis

The Burgess Company and Curtiss, through Mr. W. Starling Burgess who has just recently returned from England, where the negotiations were made, have obtained the sole rights to manufacture the Dunne aeroplanes in the United States, and it is stated that the construction of the first machine is already under way at Marblehead.

The Dunne machine is a very interesting type and for descriptions, photographs, etc., we refer our readers to recent numbers of Aircraft especially that of September, 1913, which dealt with this machine and the subject of inherent stability to some extent.

Army Aviation School at San Diego

The Signal Corps Aviation School at San Diego started the winter theoretical course of instruction on December 8th by a course on aeromechanics and aeroplane design by Dr. A. F. Zahm, Ph.D., Secretary of the Advisory Council of the Langley Aerodynamical Laboratory. This course will comprise a series of twenty-two lectures and will be illustrated practically on the ground with machines now at the school.

Professor W. F. Durand, of the Leland Stanford Junior University, will lecture on propellers on December 30th and 31st. At the close of Doctor Zahm's course, Dr. W. J. Humphreys, Ph.D., will give a course of lectures on meteorological physics and the laws of the atmosphere as applied to aeronautics. Doctor Humphreys' course will be followed by a course on the theory, design and operation of internal combustion motors by an authority on this subject, and this course will be followed by one on topography, aerial reconnaissance, and photography and radio-telegraphy.

The practical instruction at the school is, we believe, the most thorough in the world. The experience gained by the U. S. Signal Corps has demonstrated that it requires from nine months to a year of training and extended cross-country work before an aviator can really be considered properly trained for military purposes. The course of instruction at the civilian aviation schools is very short, and as soon as a man can fly sufficiently well to pass his tests for an F. A. I. pilot's certificate he is considered an aviator, but not so in the U. S. Army.

San Diego is an ideal place for training flyers, owing to the unusually favorable weather conditions. Flying begins at daylight and is over by ten in the morning, when the instructor delivers his lectures to the officers who are assembled on the field, where he has the advantage of the machines and engines for demonstration purposes.

It is understood that the U. S. Army will get quite a considerable increase from Congress this session in the number of officers and men for aviation duty, and between $300,000 and $400,000 for machines and maintenance purposes.

Bath, N. Y.

The Thomas Brothers Aeroplane Company's school at Bath is in full activity. Percy Van Ness Charles Greider, C. H. Cory and Wm. C. Stewart are ready for their license tests and later pupils are making straightaway flights and falling in line with promising adaptability.

Frank Burnside has been giving some really splendid exhibitions of fancy flying lately and reports are to the effect that it would be impossible for a pilot to bank his machine more steeply than he without turning over on his side and flying upside down. The Thomas machine acts perfectly under his control and Mr. Burnside says flying this way is just like play.

A new type of flying boat, which will be completed shortly, is being built by the Thomas Brothers which they consider a great improvement over anything they have previously turned out.

Gaston Fanet, of Paris, a well known Deperdussin pilot, has joined the Thomas Aeroplane Company's staff and will be seen flying the Thomas monoplane this coming season.

Arthur Blasiar, who recently made his debut into the aeronautical manufacturing industry, is making rapid strides and already thinking of moving into larger quarters. He reports several pupils already enrolled for flying boat courses and they will receive personal instruction under Walter E. Johnson at his winter training camp in Tampa, Fla. This new constructor, who is a strong advocate of the monoplane, is considering the early construction of a monoplane type flying boat.

Walter Johnson has been filling engagements at Louisville, Ky., flying his Thomas flying boat which is equipped with a Kirkham motor.

Peoli—Modern Santa Claus

Cecil Peoli has been filling some very interesting and important engagements during the past month in the Baldwin biplane. Perhaps the most pleasing, if not spectacular, event was that in which he acted Santa Claus arriving in an aeroplane on Fletcher's Field, Montreal, Canada, where a crowd of about 20,000, the majority, of course, being children, awaited him.

Dressed in the usual garb of red, trimmed with white fur, and a flowing white beard, Mr. Peoli started at a distance of about ten miles out of the city on the afternoon of December 6, and arrived over the Field at a height of about 2,000 feet. The excitement of the young expectants was so great that the police had their hands full to keep a place clear for a landing, but after hovering aloft for a while a safe descent was made, the crowd closing in on the first Father Christmas to really arrive on a flying machine.

Benoist Flying Boat Service

The Benoist Air Craft Company, of St. Louis, has just closed a contract with the city of St. Petersburg, Florida, to establish a flying boat service between that town and Tampa, Fla., on January 20, 1914.

Under the contract the aviators are to carry twelve passengers each way a day in two flying boats, each trip to take from fifteen to twenty minutes. The passage is made in a motor boat in an hour and a half.

Mr. Alfred W. Lawson, Editor,
Aircraft, New York.

Dear Sir:

I understand the Government put out specifications for Aeronautical Motors about two weeks ago, but I did not see anything about it in your December number, therefore I decided *it is not*, but if they have put out specifications I would be glad to have a copy.

I have a number of plans under consideration in regards to my motor. I have kept my latest improved motor from publication of any description. I have recently applied for a patent in Great Britain. As soon as I get the Patents under way in other countries I will be in a position to allow publication, and I shall be glad to give you the first article when I am ready.

(Signed) John W. Smith.

In reply to the above we will state that the Government has recently issued no new specifications covering aeronautical motors, therefore, the conclusion arrived at IT IS NOT is correct.

Editor of Aircraft.

Hammondsport

TESTS CURTISS BOAT FOR GERMANY.

Lieut. Hermann Wahl, a German naval constructor, has just completed a series of trials at Hammondsport, N. Y., of a new flying boat designed by Glenn H. Curtiss for Germany. The tests, which proved very successful, included a duration flight of more than an hour at full speed; a drifting test in which the machine with motor stopped, was turned loose; an altitude of 1,500 feet was required to be attained in 15 minutes. These tests were made with a useful load of 600 pounds.

A large fleet of flying boats is under construction at the Curtiss plant for distribution to England, France, Germany, Italy, Russia and the United States.

Lieut. P. N. L. Bellinger made many flights while trying out a gyroscopic stabilizer, flying on one occasion from Hammondsport to Penn Yan and return, a distance of about 40 miles.

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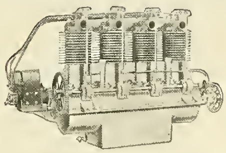

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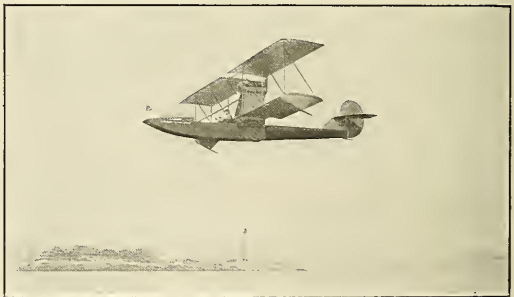

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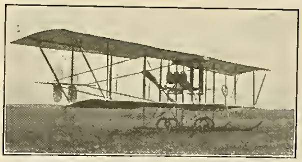

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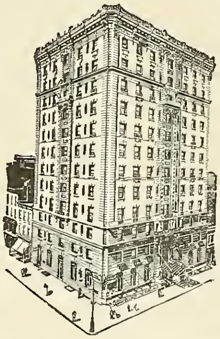

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It represents only one line of opportunities open to Curtiss pupils. We can tell you of other openings and why they are increasing in number.

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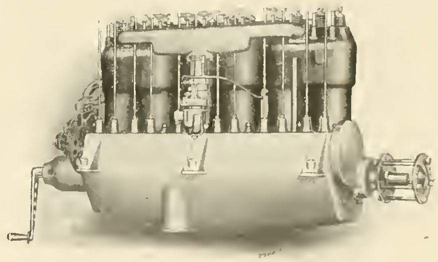
IN A CLASS BY ITSELF



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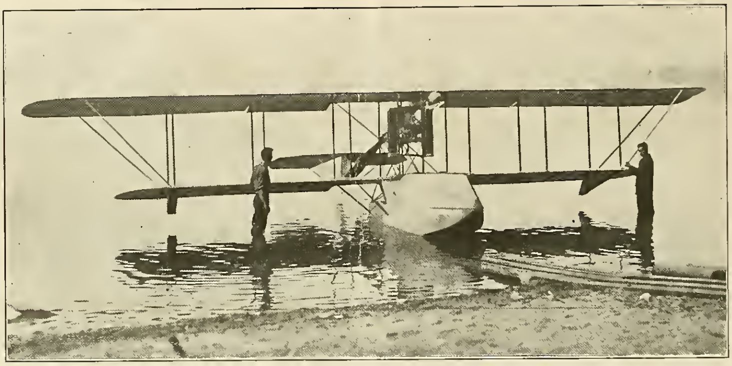

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EVERY OWNER IS SATISFIED AND DELIGHTED!

THE THOMAS FLYING BOAT IS PRACTICALLY UNSINKABLE. It is almost impossible to wreck it, for the reason that the hull is constructed of two-ply planking and is entirely covered with sheet steel.

The fact that the THOMAS FLYING BOAT will not absorb water is one of many reasons for its great and UNSURPASSED EFFICIENCY.

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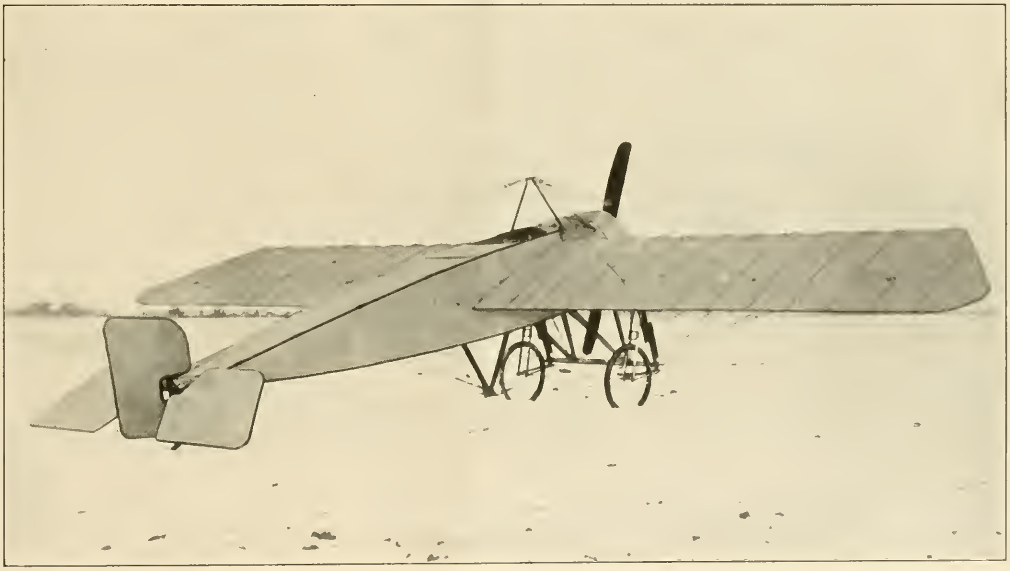
IF YOU SEE IT IN AIRCRAFT—IT IS. IF YOU DO NOT SEE IT IN AIRCRAFT—IT IS NOT

AIRCRAFT

Vol. 4 No. 12 FEBRUARY, 1914 25 Cents a Copy

GUATAMALA'S NEW MILITARY MONOPLANE



The picture above is a reproduction of the Moisant military monoplane, built for and recently shipped to the Government of Guatamala, which country has engaged C. Murvin Wood of the Moisant Aviation School, to supervise the organization and instruction of a military aviation corps. This machine with a 70 H. P. motor has developed a speed of over 70 miles an hour, has reached an altitude of 8,000 ft., has flown in a 32 mile wind and has left the ground in 96 ft. from the starting point.

An American Made Machine Exported to a Central American Government.

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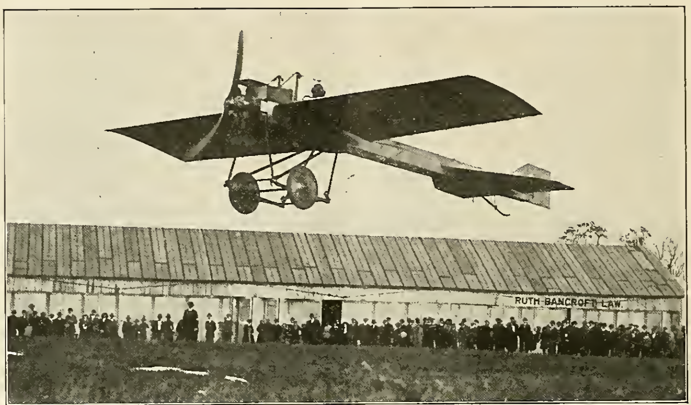

November AIRCRAFT says: John Guy Gilpatric just starting his flight around New York City in the Aerial Derby in his new 50 H. P. Gnome motored Sloane-Deperdussin monoplane. Gilpatric's flight was probably the most remarkable one of the race for the reason that he was using a very light machine which made it more difficult to navigate through the very heavy winds encountered, and it speaks well for our American manufacturers of monoplanes in that the machine had only been flown for a few minutes previous to entering the race.

Gilpatric flew the above machine in the Times Aerial Derby without any adjustments after it left our factory and with less than five minutes' trial in the air

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MONOPLANES which are the standard in design and construction
FLYING-BOATS for sportsmen both monoplane and biplane types
Boats that are entirely satisfying

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SLOANE AEROPLANE COMPANY

1731 BROADWAY, NEW YORK CITY

These pictures show W. Starling Burgess of the Burgess Company and Curtis, Marblehead, Mass., and one of the military aeroplanes of his design. In this machine are seated Lieut. Milling and Lieut. Sherman, who last April established an American long distance, cross-country record of 236 miles. Mr. Burgess enjoys the distinction of having designed seven distinct types of aeroplanes during the past five years, every one of which has been flown successfully. Not only does Mr. Burgess stand pre-eminently among the American aeroplane designers and builders, but he also has shown great foresight as a business man, for about three years ago he made an arrangement with the Wright Company to pay royalty for the use of their patent rights in his machines, and since Glenn H. Curtiss has been defeated so completely by the Wright Company in the Courts, Burgess' movement in making such arrangements with the Wright Company now shows the wisdom of his early judgment. Furthermore, Burgess has also strengthened his position in America by obtaining all the patent rights of the Dunne auto-stability flying machine in this country. Moreover, with Curtiss eliminated, the business of Burgess with the U. S. Army and Navy should be increased two-fold, for up to the present time neither the Army or Navy have purchased any other machines except the Wright, Burgess and Curtiss machines. As a designer and builder of flying boats, W. Starling Burgess has also demonstrated that there are none better in this, or any other country in the world.

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AIRCRAFT

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equipped with twin screws, driven by the new Wright six cylinder 60 H. P. motor, fitted with muffler and electric starter.

This craft is the development of years of careful experiment and combines in its novel form the best practice in hydro-aeroplane and flying boat work. The dangerous features of the flying boat—lack of safety in flying, shipping of water and foundering in a rough sea, addition of weight, due to water soaking, the presence of the motor unprotected over the heads of the passengers, and the drag and unseaworthiness of the long fuselage hull, have been eliminated.

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The craft is perfectly adapted to the use of sportsmen as a machine for comfort and safe travel over water at high speed.

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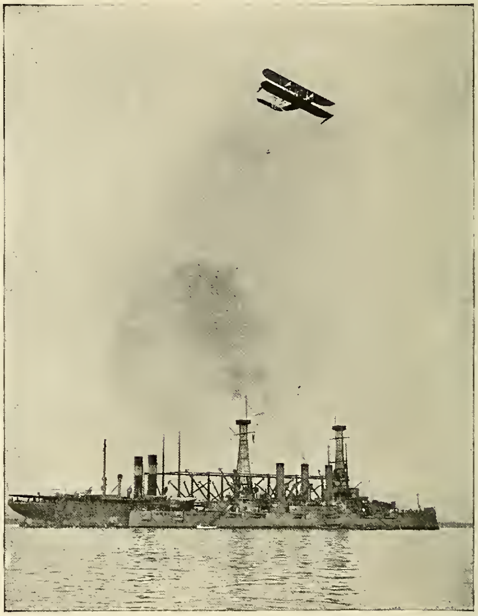
AERO MOTORS in NAVY SERVICE



Lieut. Alfred A. Cunningham, U. S. M. C. flying over the battleship "Connecticut" in a Burgess Hydro-Aeroplane equipped with

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STURTEVANT Aeronautical Motors are the only muffled aero motors in the world in daily service. They are the only American Motors used by the United States Government other than the Wright and Curtiss.

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AIRCRAFT

Vol. 4 No. 12 NEW YORK, FEBRUARY, 1914 25 CENTS A COPY $2.00 A YEAR

REVIEW OF THE FIFTH PARIS SHOW

By BARON L. D'ORCY

THE Fifth Paris Aeronautic Show (December 5th to 25th), which was inaugurated by the President of the Republic, can be considered in many ways as quite unique and epoch making, although superficial observers and pessimistic spirits seem to deny any progress.

Evidently all depends on definition. If progress consists in producing novel but weird machines, showing chaotic imagination instead of organized engineering skill, then the Fifth Salon was not in advance on last year's show. But, I believe, and most engineers will agree, that the entire absence of freak machines at this show and the fact that most aeroplanes tend towards a uniform type, gives more credit to the progress accomplished in one year than any extraordinary revolutionary machine would do. Because the unification of types is undeniably stronger than ever.

Not only do the monoplanes converge versus the bird—of which the prototype is the Ponnier 60 H.P. Le Rhone established according to the dimensions of spread, surface and length given by a French ornithologist, M. Maignau, who made comparative studies of various birds—the well set fundamenta of the actual aeros are also illustrated by the fact that the principal firms present machines which show a gradual evolution of former types and can be immediately recognized as the representative types of a firm. This evolution brings forth a certain stability of construction, which, while not opposed to novel ideas, does not sacrifice years of work to a new conception that may seem excellent in many ways and still prove a failure.

Therefore, real progress at this show is only found in the execution of details. Indeed, how could it be otherwise now that all machines tend toward a general type of biplane and of monoplane?

Main Surfaces

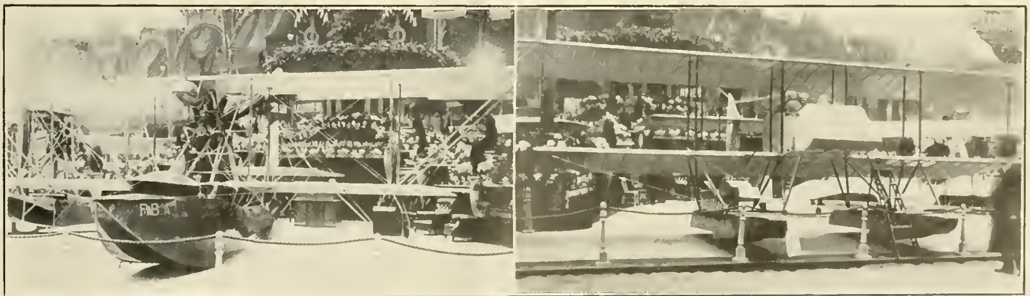
The shape of the main or supporting surfaces is the most important problem in the conception of an aeroplane; it is also the most difficult to solve.

While most firms still cling to the well-known concavo-convex surfaces used in the past, there seems to be a slight movement in favor of the "twisted planes," i. e., which have less incidence at the outer ends than at the middle. Such are the Moreau and the Nieuport. The entering edge of the surfaces begin to show the influence of Constantin's theories; many firms use thick entering edges with a strong negative incidence which act as air deflectors in order to increase the depressure on the top side.

Variable incidence at will is incorporated in the new Bathiat-Sanchez, De Beer, Ratmanoff and Schmitt machines; in the latter the angle is controlled by two concentric steering wheels, the smaller being for slight changes, the larger for great intensity. The Schmitt biplane is said to be able to alight at 25 kiloms.; the change of incidence is effected by the whole cellule pivoting around a transverse axle.

Auxiliary Surfaces

Longitudinal stability is solved in three ways: by a fixed lifting tail, by a fixed non-lifting tail and by a movable tail without empennage.



Picture on left is a 100 H.P. "Gnome" Franco-British flying boat. The firm that builds this boat controls the d'Artois, Curtiss and Leveque patents. The picture on the right shows the new Caudron 100 H.P. seaplane adopted by the French Navy.

The first solution is used by Bathiat-Sanchez, Bleriot, Caudron, Borel, Goupy and both Farmans.

The non-lifting tail is employed by Bristol, the Borel torpedo, De Beer, Deperdussin, F. B. A., Nieuport, Ponnier and R. E. P. The form of the fixed fin is either semi-circular or triangular.

The third solution, which is the novel one, and where the fixed fin is suppressed, are found on the Breguet, Clement-Bayard, Morane-Saulnier, Moreau and Schmitt.

The all movable tail responds well to the aeroplane practise nowadays in vigor, which calls for one point centering, i. e., coinciding centres and coinciding masses. In this respect unanimity is almost reached, the only exceptions being the Morane "Parasol" and the Moreau aerostable with low centre of gravity, and the Breguet with distant masses [masse (motor)—surface-masse (pilot)]. It must be said that the use of a lifting tail is much decreasing, and so are the vertical fins.

Bodies

For monoplane practice the fuselage has now become a general rule, owing to the use of tractors. The few experiments with propeller-monos, carried on by request of the Army have not given very brilliant results and the death of poor Perreyon made Bleriot give up this type. On the other hand monoplanes may ultimately yet become propeller machines if the Tatin theory (propeller in back of fuselage) proves right. This year Borel presents such a machine.

With biplanes the practice shows quite an opposed tendency; there are only three tractors at the Show, Breguet, Bristol (the only British machine) and Schmitt. Astra, Clement-Bayard and Zodiac have given up building biplanes or aeroplanes at all, while Caudron, at least on his seaplane, has put the propeller behind the main planes, this according to a request of the Navy.

The Dunne naturally stands out alone in its type; so does the Moreau.

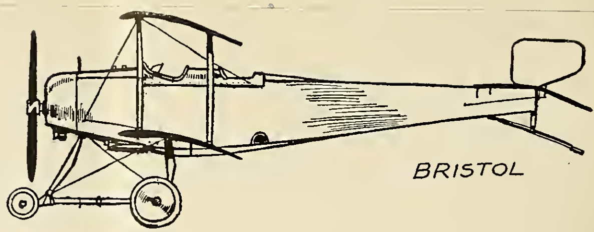
If prophecies were not so delicate in aeronautics, one might say that the monoplanes will remain tractors and the biplanes, propellers—if the "all-in-back" propellers won't unite some day all tendencies, which is not at all impossible.

Running Gears

Running gears show in general a greater advance towards unification than any other organ of the flying machine.

The long waged warfare between the skid and the wheel has come to an end with the overwhelming victory of the latter. Even the most energetic supporters of the skid have now condemned it. Such are the Clement-Bayard, the R. E. P., the Nieuport, Breguet and both Farmans.

The 1914 running gear is being made in two types: the four-wheeler for heavy machines and biplanes in general (Bre-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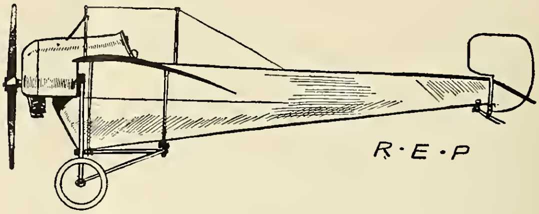
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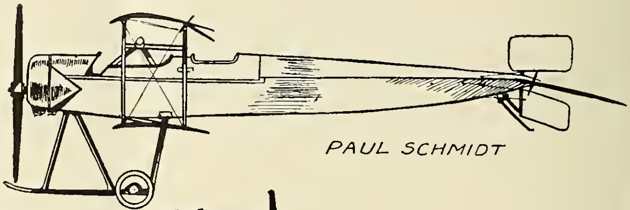
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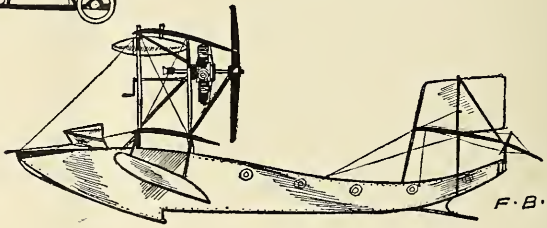
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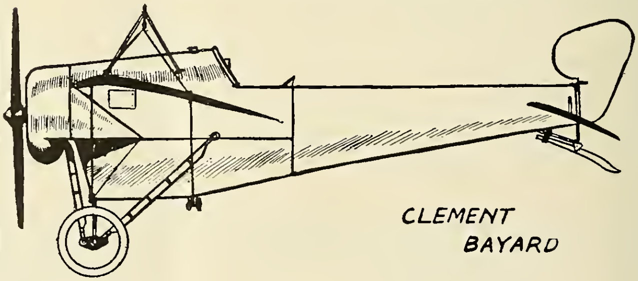
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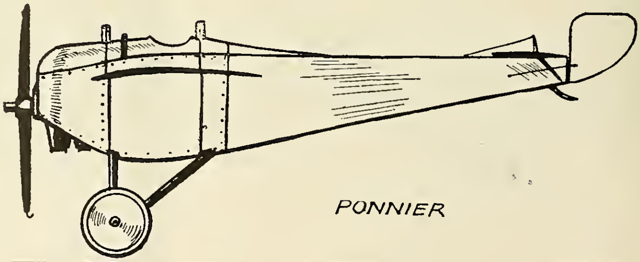
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SOME CONSTRUCTION DETAILS OF MACHINES EXHIBITED AT THE RECENT PARIS SHOW

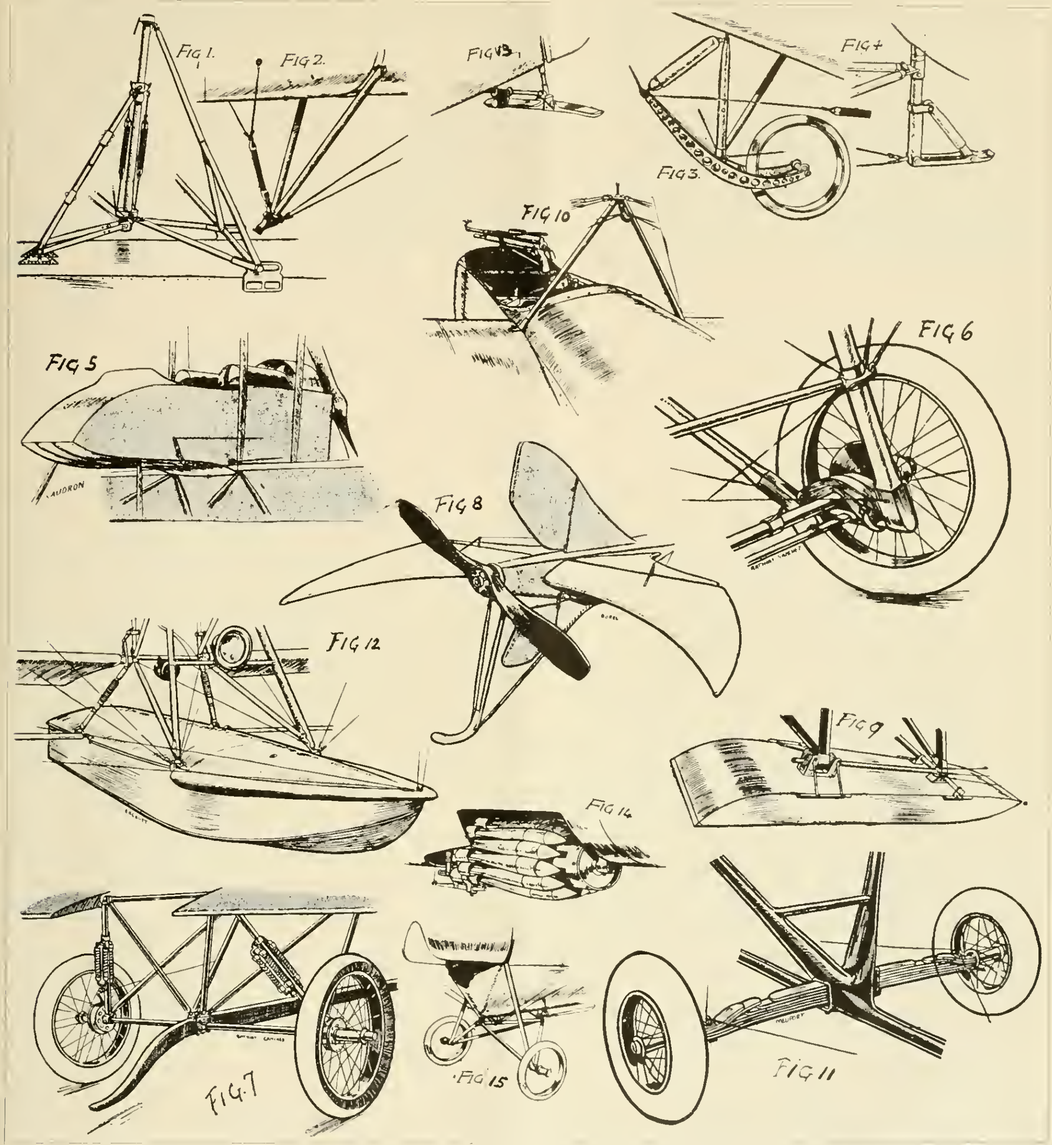
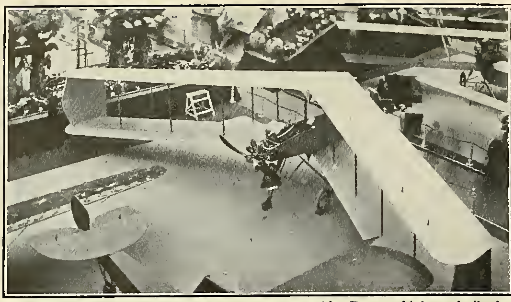
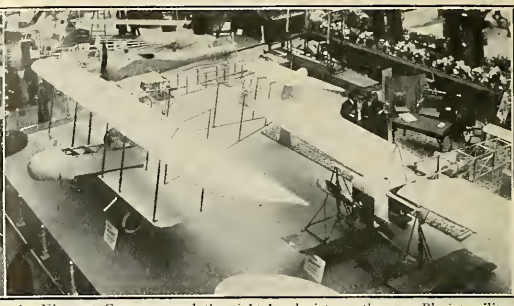


Fig 1 Ingenious arrangement showing adaptation of a regular Blerìot chassis spring to waterplane. The central tube moves vertically up and down while the lower pair of forks is anchored rigidly to the float. The front triangle is rigid and therefore the crossbar works in slides which allows the float its fore and aft action. Fig. 2—Shows another Bleriot detail in the shape of the tail skid of the monocoque scouting machine. The steel tubes holding the ground brake are rigid and held forwara by wires. As may be noticed, the brake is held central by a piece of rubber shock absorber. Fig. 3 Shows the construction of one half of the new Bleriot biplane chassis. Fig. 4—Tail skid of the Bleriot biplane in which small sheet steel skid is carried on double telescoping springs. The right hand side of the triangle telescopes and the collar to which the upper end is fastened is attached to a tube which telescopes outside the upright post. Fig. 5—The nacelle of the Caudron hydro. Fig. 6 Showing detail of the springing of the Bathiat-Sanchez monoplane. Fig. 7—Rear portion of the Bathiat-Sanchez biplane chassis which is of a somewhat unusual type. It consists of two main wheels mounted on stub axles and sprung by rubber shock absorbers, while under the nose of the nacelle and supported on another structure of steel tubes are two smaller wheels. A stout wooden skid connects the axles ot the two pair of wheels and terminates at the back in a down swept heel which takes the place of the ordinary tail skid. Fig. 8—Propeller and tail planes of the interesting Borel "Ruby" which is a very radical departure not only from the usual Borel, but from aeroplane design generally. It is designed to meet the demand of military authorities for a machine in which the propeller is mounted behind the main planes, for the pilot's and observer's seats to be situated well out in front to facilitate observation and to allow of a gun being mounted in such a manner that it may be fired in any direction without the propeller interfering with it. Fig. 9—The springing arrangement of the Borel floats which are hinged at the forward end to front cross tube of the chassis. The bracket at the rear end is carried on rubber cords as shown. Fig. 10—The gun mounting of the Borel "military" monoplane. Fig. 11—Leaf spring of the Nieuport tandem two-seater. Fig. 12—Main float of the Breguet hydro which is attached to the fuselage by four steel tubes of which the rear pair have coil springs introduced into them while the front pair form a swiveling joint with the float, thus providing springing of the rear portion of the main float. Fig. 13—Shows Clement-Bayard tail skid, which is a simple lever pivoted in the middle and held at its forward end by rubber cords to the stay which holds bottom of the swivel. Fig. 14—Rotating barrel of bomb dropping revolver used on the Bristol. Fig. 15—R. E. P. tail skid and stern post and rudder post connections, the whole thing being made of steel tubing.

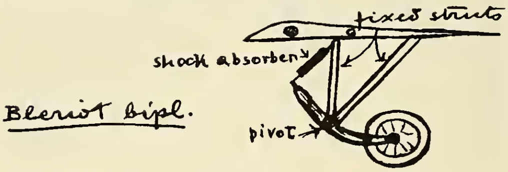




The left hand picture shows the auto-stable Dunne biplane built by the Nieuport Company, and the right hand picture, the new Bleriot military biplane and the convertible hydro-aeroplane exhibited at the recent Paris show.

guet, Bristol, Bathiat-Sanchez, Moreau), and the two-wheeler for light machines, monoplanes and single-seaters in general (Bleriot, Borel, De Beer, Clement-Bayard, Nieuport, Ponnier, Deperdussin, Ratmanoff, R. E. P., Bathiat-Sanchez monoplanes and Henri Farman biplanes).

The few firms who still cling to the skids, use them exclusively for resting the machine's back when on the ground (Caudron and Maurice Farman); but no one believes nowadays that a pair of skids can prevent a machine from turning turtle in a steep landing. Quite to the contrary, for many capsizals were caused just by a skid which caught in an obstacle on the ground.



The general form of the two-wheeler is formed by two vertical V or U struts, which are connected by a fixed axle to which the movable wheel axle is attached by rubber rings. This system has proven to be by far the best owing to its simplicity, strength, little head resistance and ease of repair.

New two-wheelers are shown on the Bleriot and Dunne biplanes; there the wheels are fixed on a J type steel strut fitted with shock absorbers, which make the strut act as a skid whenever the wheel is giving away. This gear seems to be full of promise to the writer. The more so as the wheels can turn in any direction.

Wing Trussing

The great improvements on running gears have also brought forth a much safer wing trussing. In former years it was general practice to truss the monoplane wings to the skids or the skid struts; this very dangerous system which caused several deaths, owing to the wing rupture in consequence of a damaged or weakened running gear, is being with advantage modified towards a system of independent trussing, whose fixed element has no contact with the running gear. Clement-Bayard and R. E. P. used this trussing already last year. On their machines the pentagonal form of the fuselage permits the trussing on the lower edge of the body itself. Now several other firms use similar systems; where the depth of the fuselage is not sufficient, and independent truss and warp pyramid is used. Nothing new is to be said about biplane trussing; the girder construction is still holding its own.

Controls

The Bleriot cloche is now generally adopted with the exception of Breguet and Deperdussin, who employ a slightly modified system but of which the principle is always the same.

Hulls and Floats

Water flying is progressing pretty slowly over here and nothing revolutionary was to be seen on this subject at the Show. Still the new F. B. A. flying boat presents a very fine sea-worthy hull, which distinctly shows the combined influence of the former D'Artois and Leveque firms, tending towards the conception of a real boat in antithesis with the quadrangular cigar boxes. As to floats nothing really new is shown if we except the neat flexible float fixing of the convertible Bleriot monoplane.

Motors and Propellers

The great novelty in motors are the two new "monosoupapes" Gnome: a 7-cylinder 75 H.P. and a 9-cylinder 100 H.P where the additional air is taken in by the exhaust valve. A valveless rotary has also appeared—the Esselbe, which is operated by sliding distributors. All the motors are incased now in bonnets.

Chauviere is showing an entirely copper cased propeller which should prove good for water flying and a variable pitch propeller which has to show yet what it is worth.

En résumé: Progress, slow but organized progress, tending towards standardizing and simplifying all organs.

THE WRIGHT-CURTISS DECISION

On February 27, 1913, Judge John R. Hazel of the United States District Court, western district of New York, handed down a decision favorable to the complainant in Wright Company vs. the Herring-Curtiss Company and Glenn H. Curtiss. But the judge closed by saying that "because of the importance of the litigation and of the questions involved, a supersedeas will be allowed upon condition that an appeal be diligently prosecuted."

Following this decision, the Curtiss Company appealed to the United States Circuit Court of Appeals, second circuit, and on January 14th, 1914, this higher court, before Lacombe, Coxe and Ward, Circuit Judges, upheld the previous decision of Judge Hazel, as follows:

"This cause comes here upon appeal from an interlocutory decree of the District Court, Western District of New York, upholding the validity of a patent and finding infringement thereof by defendants. The patent is number 829,393, issued May 22, 1906, to Orville and Wilbur Wright for a flying machine. The claims in controversy are numbers 3, 7, 14 and 15. Per Curiam:

"The questions presented in this case have already been fully discussed. In the case at bar Judge Hazel wrote an opinion, upon granting preliminary injunction, which will be found in 177 F. R. 257. Upon appeal from that decision this court filed a brief memorandum 180 F. R. 111. Subsequently in a suit by the same complainant against a different infringer

Judge Hand elaborately discussed the questions; Wright vs. Paulhan 177 F. R. 261. The opinion of Judge Hazel at final hearing, now here for review, will be found in 204 F. R. 597. As we are in full accord with the reasoning by which he (and Judge Hand) reached the conclusions that the patent in suit is a valid one, that the patentees may fairly be considered pioneers in the practical art of flying with heavier-than-air machines and that the claims should have a liberal interpretation, it seems unnecessary to add anything to what has been already written. That the third claim, when liberally construed, has been infringed seems too plain for argument. As to the other claims, in which the vertical rear rudder is no element we are satisfied from the testimony, as was the court below that during some parts of their flight defendant's machines use the rudder synchronously with the wings so that by their joint action lost balance may be restored, or a threatened loss of balance be averted. Such use of the rudder constitutes infringement and a machine that infringes part of the time is an infringement, although it may at other times be so operated as not to infringe.

"Touching the question of the sufficiency of notice as a basis for damages and profits, under Sec. 4900 U. S. Rev. Stat., we are of the opinion that the notice to Glenn H. Curtiss was sufficient not only for himself but also to charge the corporation, which he thereafter organized to exploit his machine and of which he was an officer. The decree is affirmed with costs."

On January 3, 1910, Judge Hazel, sitting in circuit, held the Wright patent infringed in a motion for preliminary injunction and on June 14th, 1910, the Federal Circuit Court of Appeals, second circuit, per curiam, held the preliminary injunction not warranted by the proofs, so that out of the four decisions, three have been in favor of the Wrights and one in favor of Curtiss.

For the reader who wants to become more familiar with this case we refer him to the "Wright Curtiss Decision" published in the April, 1913, issue of "Aircraft," page 34.

On January 14, 1914, Alpheus F. Barnes, Secretary and Treasurer of the Wright Company, made the following statement: "We can only express the opinion that to students of aviation the decision of the Circuit Court of Appeals was inevitable. Personally, I have always felt that the fight waged by the defendants was an unjust one, prosecuted in bad faith, and with the sole object of delaying the final result."

SOME OF THE MOTORS SHOWN AT THE FIFTH PARIS AERO SHOW

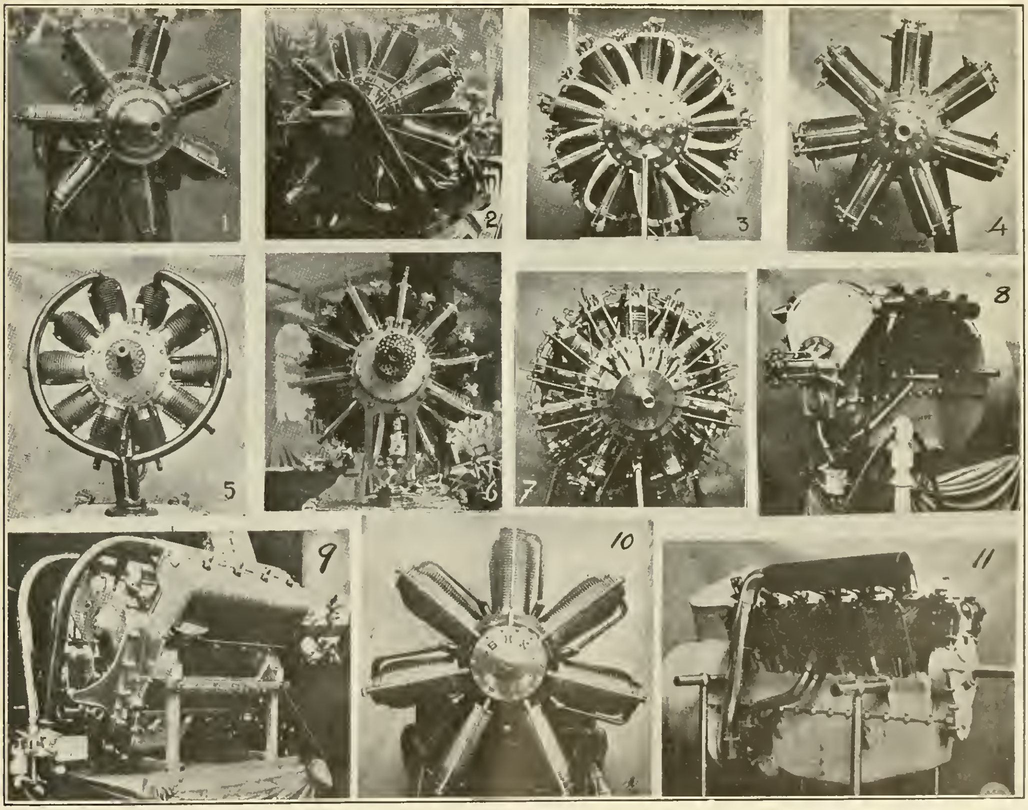
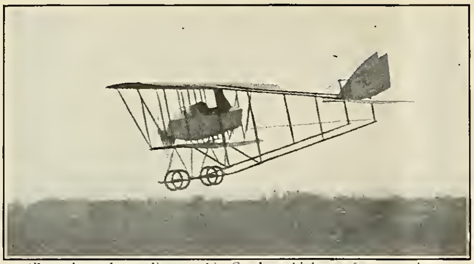


Fig. 1. Rotary 7-cylinder Gnome monosoupape motor. Fig. 2. Two hundred H. P. 18-cylinder rotary Gnome. Fig. 3. Le Rhone rotary motor, 160 H. P. 18-cylinder. Fig. 4. Seven-cylinder 60 H. P. Clerget rotary. Fig. 5. Anzani motor, 10-cylinder 65 H. P. Fig. 6. Anzani 20-cylinder 100 H. P. motor. Fig. 7. Water-cooled, 14-cylinder 200 H. P. Salmson motor. Fig. 8. "V" type 8-cylinder 100 H. P. De Dion motor. Fig. 9. Eight-cylinder "V" type, 100 H. P. Panhard motor. Fig. 10. The new S.H.K. 7-cylinder 70 H. P. monosoupape rotary. Fig. 11. Renault "V" type 12-cylinder 100 H. P. motor.



Chanteloup descending on his Caudron biplane after carrying out some extraordinary looping at Hendon recently.

Foreign News

BY

Arthur V. Prescott

Belgium

Chevilliard was in Belgium and gave a fine display of looping-the-loop, etc., on his Farman machine, before a large crowd at the Berchem Aerodrome, near Brussels, on December 10.

In very high winds Chanteloup gave a looping-the-loop exhibition on his Caudron machine at Laeken, in Belgium, on December 14. He was also flying at the same place on the following day, in one ten-minute flight making six successive loops, and flying for several seconds with the machine upside down.

China

A BIPLANE MADE IN PEKING

A biplane has been constructed recently at the Nanyuan Aviation School entirely under Chinese supervision. All the materials except the motor were of Chinese make. The authorities are now making a series of tests prior to the acceptance of the machine by the General Staff.

CHINESE AIRMEN TO INSTRUCT CHINESE ARMY.

Art Lym, a Chinaman who acquired the art of flying in America, has become an instructor in aviation to the Chinese army.

Mr. Lym, who is 21 years old, is the son of a San Francisco merchant. Born in San Francisco, he studied in the public schools there until three years ago, when he became a reporter for the Chinese *World,* one of the leading Chinese dailies in that city. A year ago he decided to take up aviation as a business, and became a qualified airman last June.

Yuan Shih-kai, President of the Chinese Republic, learned of young Lym's success as an aviator and instructed the Vice-President, Lin Yun-hong, who is also head of the Chinese army, to offer the young man the position of instructor in aviation.

Egypt

Lord Kitchener experienced his first flight on December 29, when the aviator Olivier carried him as a passenger in his biplane for fifteen minutes over the suburbs of Cairo. The British representative for Egypt became very enthusiastic after his trip and pronounced flying as "a splendid game."

PARIS-CAIRO FLIGHTS

On December 29th Jules Vedrines landed at Heliopolis, a suburb of Cairo, thus bringing his 3,500 mile journey from Paris across Europe and Asia Minor to Africa to a successful conclusion. Many interesting episodes are recounted of this five weeks' cross-country flight, especially from an educational standpoint, as for instance, the excitement and almost consternation of the inhabitants in some parts, who prior to this demonstration were practically ignorant of the fact that man could fly.

General Francis Xavier Bonnier also reached Cairo by the air route, arriving there almost on the "heels" of Vedrines, after completing the same journey as outlined above.

FLIES FROM CAIRO TO KHARTUM

On January 12th the French airman Pourpé completed a flight from Cairo to Khartum, covering the distance of about 320 miles at the rate of 75 miles an hour.

Flying high, Pourpé encircled excited crowds, and alighted within ten yards of a white spot marked for his descent. As he jumped from his machine the Sirdar, Sir Reginald Wingate, and Lady Wingate greeted him warmly.

He received a tremendous ovation from the natives, who were spellbound.

England

MARCONI FLIES AS PASSENGER.

William Marconi accompanied Grahame-White as a passenger in an aeroplane flight at Hendon on January 4.

The wireless inventor stated that he had previously had a flight in Africa, and that he intended shortly to carry out a wireless experiment with aeroplanes.

AEROPLANE SLEDGES PART OF SHACKLETON EXPEDITION

Details of the Shackleton Antarctic expedition, the main object of which is to cross the Antarctic Continent from sea to sea, making the South Pole a halfway stop, include sledges of rather larger than the ordinary size, equipped with aeroplane engines and propellers mounted on them. Important results in geographical, geological and magnetic knowledge are expected.

"LOOPERS" IN ENGLAND

On December 26 three aviators demonstrated looping the loop and other aerial acrobatics, giving performances at Hendon, London and at Aintree, Liverpool, at which latter place Mr. C. B. Hucks won a wager for making a demonstration of the latest of aerial feats in a gale blowing sixty miles an hour. At Hendon, Pierre Chanteloup and Gustav Hamel were the participants in this latest disportment. Mr. Hamel made three single loops within a minute of each other and then two more, and also flew upside down. M. Chanteloup on a Caudron biplane executed loops from a height of 1,000 and 1,200 feet, and also made a backward loop.

MISS DAVIES, AS PASSENGER, LOOPS THE LOOP

On January 2, at Hendon Aerodrome, Gustav Hamel, in his 80 H. P. Morane monoplane and accompanied by Miss Trehawke Davies as passenger, ascended to an altitude of about 10,000 feet and executed a perfect loop. He then descended to 300 feet, and rising to 1,000 feet, executed the loop a second time. Miss Davies, who is well known in British aviation circles as a staunch aviation enthusiast, expressed herself as delighted with her latest distinction as first of her sex to experience "looping."

NEW BRITISH NAVAL AIR STATION

It is practically certain that early in the new year a naval air station will be established at Devonport, and although at first the equipment will consist of seaplanes and aeroplanes, it is believed that an airship will be stationed there as soon as one is available.

France

ALTITUDE BROKEN BY LEGAGNEUX

Georges Legagneux established a new world's altitude record at St. Raphael on December 27th, when he rose to a height of 6,150 metres (20,222 feet). The previous height record, 19,685 feet, was made by the late Edmond Perreyon.

AEROPLANE NEWSPAPER DELIVERIES

Arrangements have been made with M. Salmet to carry parcels of the *Daily Mail* Riviera Supplement on alternate days from Nice to San Remo, and from Nice to St. Raphael and Hyeres. M. Salmet will use an 80 H. P. Gnome-Blériot, and will take up passengers during the morning and evening. As M. Salmet passes the various towns *en route* he will throw out a small parcel of papers attached to a parachute, which will carry them to the ground, where they will be taken charge of by men who will be waiting to distribute the papers.

U. S. AMBASSADOR IN FLIGHT

Among the visitors to Buc on December 13th was Mr. Herrick, the U. S. Ambassador, and he enjoyed a trip on a Blériot with Bidot. A number of members of the French Senate were present, and also witnessed flights by Senator Reymond.

WINSTON CHURCHILL VISITS BUC

Mr. Winston Churchill, First Lord of the British Admiralty, accompanied by several naval officers, paid a visit to Buc. He saw over forty machines on the ground, and most of them were seen in the air during the afternoon. Over a score of Farman machines were ranged up in line, and several of the visitors were taken up. Chevilliard gave a fine display of up-side down flying, side dives, etc.

TESTS MORANE "PARASOL"

Some interesting tests have been carried out by Gilbert at Villacoublay with one of the Morane machines with the main planes arranged some distance above the *fuselage*. The tests were watched by representatives of the French and Russian armies. With an 80 H. P. 9-cylinder Rhone motor the machine is said to have attained a speed of 120 k. p. h.

A NEW MONOPLANE

At Juvisy, a new monoplane built by de Brageas has made its appearance, and with Bobba as pilot recently made a flight of about a quarter of an hour's duration over the neighborhood of the aerodrome. The new monoplane has the motor and propeller arranged at the back of the main plane, the motor being an 80 H. P. Canton-Unne.

BIDOT SUCCEEDS PERREYON

Bidot, who has made a number of fine flights on the Blériot monoplane, has now been appointed in the place of the late M. Perreyon as chief pilot at the Blériot school at Buc.

AEROPLANE FLOTILLA TO CROSS THE SAHARA.

The National Aerial League has completed plans for a flight of a flotilla of aeroplanes across the Sahara, or Great Desert. The aeroplanes will start from Aran, a fortified town in Algeria, and the final landing will be made at Timbuktu, in the military territory of French Soudan, approximately 1,400 miles. Pyramids of stones will mark the route.

If the experiment proves successful the establishment of a regular air mail service will be considered.

A NEW BIPLANE LOOPER

Poiree gave an extraordinary display of looping the loop, figure eights and the *chute de cote* on a Henry Farman machine at Bolbec (Seine-Inferieure). The flights were witnessed by a crowd of about 10,000 persons.

HANOUILLE AT MARSEILLES

Hanouille executed several looping-the-loop flights on his Blériot machine at Marseilles. He varied his exhibition with some very impressive spiral descents, which were enthusiastically applauded by the large crowd which was attracted to the Borely Park, which was utilized as an aerodrome.

BILL JOINS THE LOOPERS

Another exponent of looping-the-loop on the Farman biplane is Bill, who made one short flight upside down, and also made circles with the planes of his machine vertical at the Buc aerodrome recently.

PEGOUD LOOPS THE LOOP WITH A PASSENGER

Following up his looping-the-loop work, Pegoud has succeeded in carrying out this evolution accompanied by a passenger on his Blériot monoplane. At Buc, on a Blériot-Gnome of the military type, with M. Andre Guymon, he looped-the-loop four times in succession. Afterwards he took up a photographer named Mathieu and again looped-the-loop four times. Previously Pegoud had been up on a 50 horsepower single-seater Gnome-Blériot, and in the course of his flight looped-the-loop fourteen times, including nine successive loops.

A few days later Pegoud was at Juvisy, and although he did not start flying until somewhat late in the afternoon, he did some extraordinary work. First going up on a 50 horsepower Gnome-Blériot single-seater to a height of 800 metres. After executing several loops he turned the machine over and made a very fine spiral descent with wheels in the air, the machine flying upside down for 2 mins. 5 secs. In a subsequent flight, after making fifteen loops he made a tail slide and regained his original height, following this up by a spiral dive downwards, and then made a loop with the wheels *inside* the circle. These manœuvres were carried out during a flight which lasted just on an hour.

On December 21st a new looper was seen at Buc. Olieslaegers, the Belgian pilot, having returned to aviation after two years' rest, and studied under M. Blériot, making several successive loops in a very clean fashion. His exhibition was varied by a series of experiments with the Blériot safety parachute with dummies liberated from a machine piloted by Bidot. On the same day "looping" flights were made by Chevilliard on a Farman at Lyon, Garros on a Morane at St. Raphael, Chanteloup on a Caudron at Nantes, and Poulet, also on a Caudron, at the Borel ground at Chateaufort.

LOOPS THE LOOP OVER PARIS

Looping the loop over the city of Paris is the latest exploit credited to Guillaux. On December 25th, although only twice before having attempted the feat, he "looped" twice over the Grande Palais, where the Fifth Paris Aero Salon was just closing, over the Bourse and over the main boulevards.

Germany

MOTOR COMPETITION IN GERMANY

The new competition for a prize of $28,000 offered by the Kaiser for aeroplane motors will be open to engines ranging from 80 to 200 horsepower, and the weight must not be more than 4 kilos per horsepower. After undergoing eliminating trials the successful motors will have to make a 60 hours' endurance test, during which two stops not exceeding five hours each time may be made for replenishment of petrol and oil. The only repairs which may be made during the trial are such as would be made by a pilot in the course of a voyage on an aeroplane with the aid of the passenger, and utilizing spare parts carried on board. The motors must be of German make, and are divided into two classes—water cooled and air cooled. The competition opens on September 1st, 1914, and entries can be made up to May 1st, 1914.

A ZEPPELIN MUSEUM

The municipal authorities of Friedrichshafen have proposed to start a Zeppelin museum on the occasion of the 75th birthday of Count Zeppelin, and Count Zeppelin has promised to do what he can to assist them in getting together an interesting collection.

ZEPPELIN WORKS IN FULL SWING

Reports from Friedrichshafen state that Count Zeppelin's shops are working overtime to turn out five new airships, of which two are for the German Army, two for the Navy, and the fifth for passenger service. The venerable Count is undaunted by the two recent disasters to his airships and previous unfortunate losses by fire and storm, and the German Emperor is backing him with moral support.

GERMAN PASSENGER HEIGHT RECORD

Max Schuler, accompanied by Lieut. Libman, have succeeded in bettering the German height record of 3,270 metres which was made by Lieut. Cantner, by ascending to a height of 3,400 metres on an Ago biplane at Johannisthal.

THE WORK OF THE "VICTORIA-LOUISE"

Some interesting figures regarding the work of the Zeppelin liner "Victoria-Louise" have recently been published by her owners, the Delag Co. On March 4th, 1912, she cruised from Friedrichshafen to Frankfort, and between that time and June 23, 1912, she made 100 trips. Another hundred voyages were made during the ensuing four months, while up to July 30th last the number was 300, and on November 26th the record was 400 trips, during which the airship had covered 47,364 kiloms., being in the air 852 hours. She carried during that time 8,551 passengers, and used 84,323 litres of petrol, 432,756 cubic metres of hydrogen and 8,782 kilogs. of oil.

SPHERICAL BALLOON RECORD

The German balloonist Kevlen, who, with two passengers, ascended from Bitterfeld, Prussian Saxony, in the balloon Duisburg on December 13, descended at Perm, a town in European Russia, near the Siberian frontier, thus establishing a world's distance and duration record for spherical balloons. The Duisburg was in the air eighty-seven hours and travelled a distance of 1,738.8 miles.

Italy

AN ITALIAN HEIGHT RECORD

At Busto-Arsizio, on December 18th, Capt. Picco, on a Nieuport-Gnome, beat the Italian height record by getting up to 3,800 metres. The ascent took half an hour, and the return to earth about fifteen minutes.

AN AEROPLANE RACE AT BRESCIA

In connection with the motor car race which is to be held on the Brescia Circuit on September 6 and 7, 1914, it is proposed to have a race for aeroplanes. The suggestion is that as each car is started the aeroplane bearing the same number should also be sent on its way.

WITH A HYDRO OVER THE APENNINES

Cevasco, on a hydro-aeroplane, on December 14th flew from Sesto-Calende, on Lake Majeur, to Genoa, the trip of 165 kiloms. taking 1 hr. 25 mins., and the Apennines being crossed at a height of 2,000 metres.

A LONG FLIGHT IN ITALY

On December 15th, Capt. E. La Polla completed a flight of 1,100 kiloms. on his Farman biplane. The itinerary of the trip included Pordenone, Pesaro, Foggia, Naples and Rome.

Roumania

PRIZE FOR PARIS-BUCHAREST FLIGHT

Prince Valentine Bibesco, who has done a good deal to push forward aviation in Roumania, has offered to the Roumanian Aero Club a cup to be awarded for a race between Paris and Bucharest.

At Cotroceni, the military aerodrome, the aeroplanes employed are Henri Farman biplanes and Bristol tractor biplanes.

The Ligue Aerienne Roumanie, under the direction of Prince Bibesco, possesses a number of Blériot monoplanes—six two-seaters, two single-seaters, a side by side two-seater and three single-seaters.

Russia

A NEW SIKORSKY GIANT AEROPLANE

Sikorsky, the designer of the giant aeroplane which was constructed some time ago to carry eleven persons, has successfully tested an aeroplane half as large again.

This new aerial leviathan, built to carry fifteen passengers during its first trials, carried four, six, and eventually ten passengers. The machine has a span of 37 metres, it is 20 metres in length, while the lifting surface is 182 square meters, and the weight, empty, 3,500 kilogs. The *fuselage* resembles in general appearance that of the Nieuport monoplane. On each side of the *fuselage* are arranged two 100 horsepower Argus motors. As during these first tests the ground was covered with snow, the wheels were removed and the skids relied upon for landing.

A NEW RUSSIAN PRIZE

Prince Abamaleck Lazareff, who offered the Romanoff prize of $5,000 for a flight from St. Petersburg to Moscow and back in 48 hours, has now offered a similar prize, which will be given to the aviator who flies from St. Petersburg to Sebastopol, or *vice versa*, before January 1, 1915, within a maximum time of 24 hours. The distance is something like 1,500 miles.

Spain

KING ALFONSO WITNESSES LOOP

On Christmas Day Domerjoy gave a display on his Blériot at Madrid, which was witnessed by King Alfonso.

AEROPLANES IN WAR

The Spanish Army are making very effective use of their aeroplanes in the operations against the Moors. Some bombs dropped on the mass of the enemy during a fight near Tetouan on December 17th had terrible effect. Bombs dropped from an aeroplane also effectively put an end to a scheme of blockhouses which the Moors were trying.

Sweden

The first Swedish aeroplane factory is to be opened in the spring in connection with an aviation school. Baron Cederstroem, the well-known pioneer, will be at the head of the new enterprise.

Switzerland

Oscar Bider, the well-known Swiss mountain flyer, made another successful flight across the Alps on December 25. He started from Buc, France, at 9 a. m. and arrived at Berne at 2:15 p. m., notwithstanding the fact that for several hours he was unable to see his way because of a heavy fog which hung over the mountains. Bider passed over the Jura, the chain of mountains separating France from Switzerland, without being able to see any landmark, but recovered his bearings on sighting the Jungfrau about half an hour before he came to Berne.

A HYDRO-AEROPLANE RECORD

An excellent accomplishment was effected a short time ago by Paul Ehrhardt when, flying a hydro-aeroplane over Lake Constance with a passenger, he flew for seven hours without a stop, thus establishing a new hydro-aeroplane and passenger record. The useful load at the commencement of the flight was 970 pounds.

SWISS CROSS-COUNTRY RECORD

By flying from Avenches to Dubendorf and back, a round distance of about 400 kiloms., Borrer, on December 8th, won the prize of 3,000 francs offered by the Swiss Aero Club for a cross-country flight. He used a Ponnier monoplane fitted with two 80 horsepower Gnome motors coupled together, and during the trip he carried a passenger. The outward trip was made by Lyss-Soleune-Olten-Aarau-Lenzburg, while the return was by way of Zurich-Hasenberg-Berchoud-Kirchberg and Lorat. Later in the day Borrer returned with his passenger to his headquarters at Soleune.

REVIEW OF RECENT AERONAUTIC PATENTS

By LESTER L. SARGENT

In the following review of recent aeronautic inventions for which patents have been granted during the past month, the most recent patents are placed first as being, not necessarily the most important, but of first interest from a news standpoint.

Stabilizing Apparatus for Aeroplanes; patented by A. Budig, of Lille, France, January 6, 1914. Patent 1,083,347.

An automatic stabilizing appliance which is actuated by means of a vacuum created by the movement of the aeroplane. A cylinder communicates with the interior of a concavo-convex hollow plane, the cylinder being provided with a piston operated by an elevating rudder at the rear.

Aeroplane, patented by Robie Seidelinger, of Wilmington, Del., January 6, 1914. Patent 1,083,565.

A main supporting plate and laterally spaced sub-planes constitute the supporting surface, the body of the machine presenting a shallow U- or cup shape, to preserve the stability of the machine.

Aeroplane, patented by Eugene D. Francis and John D. Francis, of Oakland, Cal., January 6, 1914. 1,083,394.

A cigar-shaped body or fuselage contains the engine, and from it extend bird-like wings the angular relation of which relative to the horizontal plane of the body is capable of adjustment.

Flying Machine, invented by Oscar T. Ross, of Goldfield, Nevada, one-half of the patent rights assigned to Ward Hildreth of Chicago, Ill.; patented December 30, 1913. Patent 1,082,769.

A gyroscopic device designed as an auxiliary to add sustaining or steadying means to other machines. The claims of the patent relate mainly to spring actuated legs, the purpose of which is to prevent shock to the machine in landing.

Stabilizer for Aeroplanes, patented by Henry C. Fisk, of Stafford, Conn., December 30, 1913. Patent 1,082,688.

A stabilizer attachable to either monoplanes or biplanes and comprising the placing of a plane, preferably of circular, or similar outline, above the supporting plane or planes of the machine, and in providing means for adjusting the edge portion of this plane at various angles relative to the body portion, that is, flexing or warping it.

Flying Machine, patented by Gustave A. Wendt, of Tacoma, Wash., December 23, 1913. Patent 1,082,143.

Employs an endless conveyor and planes moving along vertical lines, with the downward traveling planes presenting their entire surface to the resistance of the air. This is added as an auxiliary to the usual propeller.

Airship, patented by John E. Allen, of Chicago, Ill., December 23, 1913. Patent 1,082,472.

A heavier-than-air ship of the dirigible type with two main propellers and auxiliary guiding propellers located at various positions and angles. A plurality of supporting planes and superimposed guide planes are an auxiliary of the airship.

Flying Machine, patented by Charles F. Jenkins, of Washington, D. C., December 16, 1913. Patent 1,081,504.

The driving motor is supported so as to act as a gyroscope, the rotary motion of which is designed to automatically manipulate stabilizing devices which may be the warping of wing edges, actuation of auxiliary planes, or other means.

Aeroplane, patented by John G. Hanna, of Galveston, Tex., December 16, 1913. Patent 1,081,828.

A fuselage or body member having movable planes, and "wind brakes" for turning and tilting and a vertical fin or keel are the principal features of this invention.

Aeroplane, patented by William E. Shouler, of Rockford, Ill., December 16, 1913. Patent 1,081,551.

Propellers at the blade tips constitute a novel stabilizing means in this machine, the wings of which are arranged in the form of a Greek cross.

Aeroplane, patented by Louis A. Vachon, of Newton Center, Mass., December 9, 1913. Patent 1,080,664.

The main object of the invention is improved means for mounting quickly from the earth in beginning a flight. This is effected by suddenly removing the rear support of the craft while running on the ground, so that by the action of gravity the rear portion of the aeroplane drops and tips the main planes at a greater angle of incidence with the air and results in a quick ascent.

Flying Machine, patented by Charles E. Smith, of Paterson, N. J., December 9, 1913. Patent 1,080,726.

A planiform supporting means is combined with a hollow carrier for the aviator, the carrier being arranged for pivotal movement relative to the frames.

Aeroplane, patented by Theodor Eising, of Hoboken, N. J., December 9, 1913. Patent 1,081,029.

A safety device designed to prevent sudden upsetting of machine in case of stoppage of the engine in midair as a result of some accident. A gyroscopic wheel is operated by the engine and arranged to continue to rotate freely by its momentum when the engine stops unexpectedly and maintain the equilibrium of the aeroplane and give the aviator time to regain his control of the aeroplane and volplane to safety.

Aeroplane, patented by Burt J. Pressey, of Newport News, Va., December 9, 1913. Patent 1,081,147.

A swinging weight (preferably the aviator's seat) is utilized as a stabilizing device for operating both lateral and longitudinal dip-correcting planes automatically and relieving the aviator of manual operation of these auxiliary planes.

Aeroplane, patented December 9, 1913, by Louis J. Bergdoll, of Philadelphia, Pa. Patent 1,080,531.

A unique circular or curved "plane" surrounds the horizontal sustention planes, the object being to present an equal resistance in all transverse directions. The inventor believes the machine to be inherently stable. The propelling motor and seat are positioned within the curved open-ended protective member or cylindrical "plane," but below the horizontal planes.

NEWS IN GENERAL

By D. E. BALL

California News

By R. H. Blanquie

The organization of a State militia aviation corps is under consideration by Adjutant-General E. A. Forbes, and the next Legislature will be asked to appropriate a sufficient sum for equipment. The Adjutant-General became first interested in the project through William W. Loram, a licensed pilot, who recently enlisted in one of the companies of the National Guard.

Lieuts. J. Carberry, pilot, and F. Seidel, observer, of the First Aero Corps of the United States competed, on the 29th of December last at San Diego, against Lieut. Telliner, pilot, and Mueller, observer, for the Mackay Trophy in a scouting duel. The first team won by flying a distance of fifty-eight miles in forty-six minutes and locating an "invading" body of troops and their equipment. The other machine damaged its landing gear while forced to alight by engine trouble on bad ground.

The contract of Robert Fowler, the aviator who was engaged by the Great Western Power Co. of Cal., to patrol its power lines via aeroplane from Oakland to Oroville, has been cancelled. The motive of the cancellation is explained as follows by E. W. Beardsley, the general superintendent of the company:

"I am fully satisfied as to the practicability of the aeroplane for patrol purposes and will give it another trial," said Beardsley. "Fowler's machine was not strong enough to do the work demanded in a high wind."

J. S. Hoffman, the constructor and aviator of an original monoplane, is busy at work rebuilding his damaged machine and expects to have it ready shortly.

The Panama-Pacific International Exposition Committee's Sunday and holiday exhibitions were, during the month of December, most successful drawing crowds of from 8,000 to 25,000 people, not counting the many thousands who witnessed the flights from the tops of the hills rising behind the spacious Fair Grounds. The chief attraction of the last few weeks was the acrobatic aviator, Lincoln Beachey, who sprung many surprising feats. His spiral dives, vertical dives, right angle turns, upside down flights, looping the loop and picking out landings under adverse conditions, demonstrated clearly the perfect control he has over his machine. The wing-spread is but 24 feet and the machine presents throughout a staunch and sturdy appearance. For making flights in an inverted position the engine has an auxiliary carburetor, with a capacity of about 1 pint, placed above. Beachey, in his last appearance in San Francisco, on Dec. 4th, looped in the air not less than seven times and once looped with the wind, which is most difficult, and upon reaching the apex of the circle banked his machine vertically and then righted it. On Dec. 30th, Beachey made a successful flight in the Machinery Hall Building, which is said to be the largest wooden structure in the world, for several hundred feet at a height of 20 feet. Upon alighting he struck a puddle and the craft skidded for some distance but was fortunately checked by his mechanics who held before the machine strips of burlap. The flight was witnessed by several Exposition officials and a handful of spectators.

The other aviators who also performed and distinguished themselves by their excellent flying are, Silas and Harry Christofferson, Roy Francis, W. W. Blakely and Frank Bryant. During a few of the meets the wind was rather high, making the waters of the bay choppy and thereby causing the hydro-aeroplanes some difficulty in gaining sufficient speed to rise.

A recent addition to the Christofferson Aviation Co. is Carl Christofferson who, like his brothers, Silas and Harry, has taken to the air. He has already made several good flights and promises to equal the flying of his brothers if not to surpass them.

Lincoln Beachey gave several exhibition flights at Fresno and Sacramento during December. On Jan. 10th and 11th he flew at the Emeryville track, Oakland.

Seattle and Puget Sound News

By Paul J. Palmer

Mrs. Alys McKey Bryant has "migrated" to the South, San Francisco, where the other "birds" have congregated. She writes that she witnessed the accident to Mr. Silas Christofferson, which the newspapers heralded as "2,000-foot fall of Silas Christofferson, Narrow Escape from Death," and states that such was not a true statement of the facts. She states that Mr. Christofferson was doing his Beachey "dip," and that when straightening out, preparing to land, one of the brainless ivory-domed and fresh owners of a speed boat hit it out for the place where Christofferson was preparing to land, and in order to prevent hitting the boat, Mr. Christofferson was forced to climb quickly, and in so doing stalled, and dropped into the bay. It is well nigh on time that the "pinheaded" spectator at the land meets and the "fool" in the motorboat who try to hinder airmen from doing their work properly should be treated in much the same manner as Villas treats his captors of war, that is, "SHOT." It isn't any too good for them.

Mr. Herbert Munter has obtained the use of a 40 H.P. four cylinder Hall Scott, and has made a propeller for the same. Will try out soon. The weight of the plane with this motor is about 550 pounds, and he hopes to be able to "flop" around a little with the new outfit.

To Raviate:

Inquisitive Son: "Say, Pop, what's Terra Firma?"

Pop: "It's the first stop of an airman after something happens."

Pennsylvania News

By W. H. Sheahan.

Although real winter weather set in several weeks ago, flying at the Eagle Aviation Field has not been entirely abandoned this winter. Nearly every week, if the weather conditions are at all favorable, the Bergdoll hangar is opened and the Wright machine put into commission.

Bergdoll made several fine flights on Dec. 28th, when the weather was so cold that it was necessary to put hot water in the radiator to get started.

Good progress is being made by Wm. Yorke, of Philadelphia, on the construction of his single seater Nieuport type, being built after Aircraft plans. The fuselage is completed and fully wired and although all parts are up to required standards of strength, extreme lightness has been obtained by reducing weight where not needed.

Yorke has not as yet decided upon what make or power motor he will install, but following closely the Nieuport idea will probably settle on a double cylinder, opposed type of about twenty-five horsepower.

Yorke has made quite a local reputation by the building of several gliders: his last machine being of the Wright type, with planes of the Nieuport section and fitted with ailerons instead of warping. This is his first full size machine for power but the same shows careful workmanship and an excellent knowledge of construction and attention to detail.

Aviator J. B. McCalley, member of the Aero Club of Pennsylvania, has given up exhibition flying for the present and is devoting some of his spare time to lecturing in the interest of the science. During the first week of December he delivered a most interesting lecture in Pittsburgh on the "Development of Aviation."

The Philadelphia Aero Club has announced a banquet with several speakers for the latter part of January. The tractor biplane upon which the club members have been working during the fall and winter months is well under way and nearing completion. Percy Pierce is the leading spirit of the club and designer of the plane.

The annual election of officers of the Aero Club of Pennsylvania was held at the Bellevue Stratford Hotel, Jan. 9th. The following officers were elected to serve the organization for the period of one year: President, Clarence P. Wynne; 1st vice-prest., J. A. Steinmetz; 2nd vice-prest., W. D. Harris; secy., Geo. S. Gassner; treas., L. Maresch; directors, Arthur T. Atherholt, H. F. Bamberger, H. H. Knerr, W. H. Sheahan, Dr. S. C. Falls and W. S. Wheeler.

The "alert photographer," who "caught Albert Heinrich in his early morning act of dodging among the clouds," as used on the cover of January Aircraft, was none other than W. H. Sheahan of Philadelphia.

Western Notes

By Dr. E. R. Cary.

Phil. Bellard and A. K. Longren are busy at Topeka, Kans., getting in line for this year's exhibition business. Floyd Smith, who has disposed of his tractor made by Patterson, is promoting a company and building a machine. Hogan has revived interest at Overland Park with a stand and machine, "Hogan's Dream," as it is called by McCallum, which reposes gracefully in parts, about the hangar along with the Girard airship.

Lieut. F. P. Lahm, the celebrated army aviator, announces from Kansas City that he has decided to quit flying. He has, like Captain Baldwin, piloted all three types of successful means of air transportation—aeroplane, dirigible and free balloon.

Katherine Stinson, who has flown throughout the Central West during the past year on Wright and a Partridge Tractor, has gone back to her original mount—a Wright machine—and at last report was at the government sheds in Texas.

Secretary of the Navy Daniels spoke recently at St. Louis on the need of aviation in the Navy, and assisted in organization of the Aviation Reserve of which Mr. A. B. Lambert of St. Louis, is head. Many, and in fact practically all, of Western and Central States flyers are enrolled in the Aeronautical Reserve.

Martin has been testing his new machine and carrying his mother and father as passengers on different occasions, one trip being a cross-country run of twenty-five miles at an altitude of about 1,500 feet. These flights demonstrate the splendid behavior and sound qualities of design of this machine, which is of splendid workmanship. In a recent climbing test it reached a height of 9,800 feet in 45 minutes.

The calamity to two more of our army aviators emphasizes the danger of sitting either in front or to one side of the engine, while the records of Martin, Benoist and other tractors, including results of the Burgess tractor for the army, testify to the safety and qualities of mounting behind the engine.

Bath, N. Y.

Pupils and flyers connected with the Thomas Brothers Aeroplane Company school at Bath, have gotten in much good practice during the past month and all now at the school show exceptional aptitude in learning to fly.

Frank Burnside, a representative flyer of the Thomas Company, has been making flights and also training pupils daily, and is getting nearer his goal in attempting to fly upside down. His favorite method in this practice is to get into a steep spiral and sometimes it seems as though he would surely go beyond ninety degrees.

A few days before Christmas, Burnside made a flight from Bath to Corning as Santa Claus and the Business Men's Association of the latter town assert that never before have they succeeded in attracting so many people to their city as by this means, which not only was a good advertisement for Corning but also swelled the storekeepers' receipts, the majority of the crowd making purchases.

Charles Fay, of Springfield, Mass., is the star pupil of the school and has made a record for learning to fly. One day recently he made fourteen circles and eight perfect landings. William Stewart and Budd Cary are also fast becoming adepts. Notwithstanding the season pupils continue to enroll at the Thomas School, the latest arrival being Mr. George McNamara of Boston, Mass.

The Blasiar Aeroplane Company of Bath, New York, reports the receipt of several orders for machines and that the business outlook for the coming year is a most favorable one for them.

Mr. Gaston Fanet, a licensed pilot of the Aero Club of France, who arrived in this country from Europe some few months ago and who has been connected with the Farman and Deperdussin concerns in France and with the Thomas Brothers Aeroplane Company, has recently joined the Blasiar Aeroplane Company and expects to give several exhibitions here during the coming season.

Walter Johnson, who has been with the Thomas Brothers Aeroplane Company for several years, has purchased a flying boat for himself and will henceforth fly in his own interests. Mr. Johnson has gone to Jacksonville, Fla., with his boat and has made arrangements to stay there and carry passengers during the winter. He also has a contract with a big whiskey firm to advertise their particular brand of goods. In Louisville, Ky., Johnson received quite a large sum of money for distributing a certain kind of gum from his aeroplane while in flight as an advertisement for the gum manufacturers, and he feels that a large new commercial field has opened up for the aviator as an advertising proposition.

Dayton, Ohio

The most interesting work at Dayton recently has been in connection with the Wright automatic stabilizer, another contribution made to the art of flying by Mr. Orville Wright, which might be said to be only second in importance to his invention of 1903 making human flight practicable.

The inventor's easy demonstration shows that efforts at equilibrium will no longer be required and that the day for aerial acrobatics will soon have run its course, for this stabilizer prevents overcontrol when the aeroplane has been thrown out of balance in one direction and the elevator is turned or the wings warped to bring it to level again.

The Wright stabilizer consists briefly of two parts. One is controlled by a pendulum for maintaining the lateral balance of a flying machine; the other controlled by a vane, for fore and aft balance. The power for warping the wings and turning the elevator is furnished by a small windmill, attached to the aeroplane so that the stopping of the motor does not affect the operation of the device. To make a turn the operator simply sets the steering lever to one side. The device automatically brings the aeroplane to the proper angle so that it neither slips inward nor skids outward; it is claimed that the device regulates the angle of banking more accurately than can the average aviator.

New Navy Air School

The naval aeronautic corps are to have the advantage of carrying out experimental work aboard a battleship in the future, the Navy Department having placed the battleship "Mississippi" at the disposal of the officers attending the aeroplane school at Annapolis, Md. This ship has been detached from the reserve fleet at Philadelphia and is to convey the Annapolis school equipment to Pensacola, Fla., the winter home of the flying corps.

Army Aviation

The lectures planned for the theoretical course of instruction at the Army Aviation School, San Diego, are being delivered in due order. Professor Durand has delivered his lectures on the theory of propellers, as scheduled, and Professor Zahm has just finished a course on aeromechanics. Those to follow are Professor Humphries, who will talk on meteorological physics and laws of the atmosphere, and Orville Wright, on the subject of the art of flying with practical demonstrations. Such a course of instruction combining as it does practical demonstrations to the students, provides for them a most thorough and comprehensive study of aviation.

Army Aviation Summary for the Year 1913

Total number of flights, 3,160 (to December 20th). Total time in air, 687 hours, 10 minutes. Total distance in air, 37,794 miles.

Army Records

Altitude: Lieut. Post, 10,500 feet, December 18, San Diego.

Altitude with Passenger: Lieut. Carberry, 7,800 feet, December 26, San Diego, Cal.

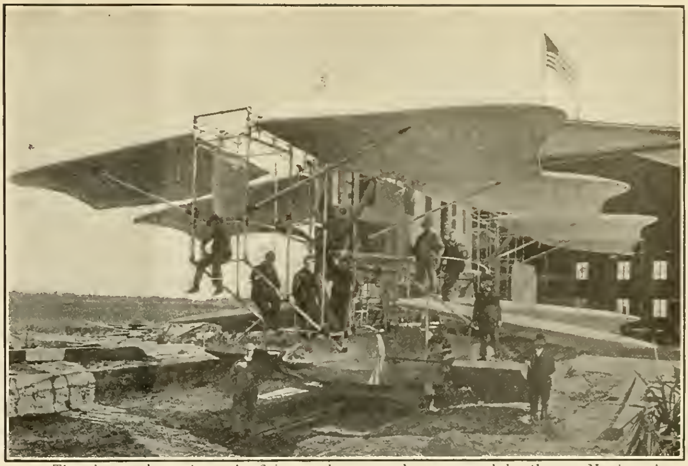
Cross-Country with Passenger: Lieut. Milling, March 28, Texas City to San Antonio, 220 miles, 4 hours, 22 minutes.

Mackay Trophy: Lieut. Carberry, pilot, Lieut. Seydel, observer, San Diego, Cal., December 29.

House Ready to Provide Aerial Corps

Congress at last has realized the necessity of providing a more efficient military aerial defence.

It is reported that at a secret meeting of the Military Affairs Committee of the House on January 14th, it was decided to grant greater appropriations than ever before for the purchase of military aeroplanes and to remove the army aviators from the Signal Corps and make a separate aviation corps in the United States Army. The appropriation will be in the neighborhood of $300,000, the amount recommended by Brigadier-General George P. Scriven, chief of the Signal Corps.



The picture above shows the flying machine recently constructed by Captain Matthew A. Batson, U.S.A. (Retired) for the purpose of endeavoring to fly across the Atlantic Ocean. It was built at Dutch Island, near Savannah, Ga., and weighs about 5,000 lbs., and the inventor of it claims an additional lifting capacity of two tons. The machine is equipped with twelve large wing planes, one pair having a spread of 39½ ft. and four pair with a spread of 37½ ft., while a sixth pair has a spread of 30 ft. The wings are designed with the purpose of guiding the air currents inwardly toward the body of the machine and there banking them under the base portion of the wings, which are concaved underneath and carried back along the chassis so that the currents of air are conducted along the parts nearest the chassis. Any wing or set of wings or all twelve may have their angle of incidence changed at the will of the pilot by the turn of a wheel while the machine is in full flight. The machine is equipped with three six-cylinder engines installed in the floor of the pilot house. These engines are supposed to supply 350 H. P. to drive the propellers at 1,000 revolutions per minute. Any one of the engines may be thrown out of or into action by the operation of a clutch. The cabin of the machine is 27 ft. long and is constructed of cypress paneling ⅜ of an inch thick, over which is a covering of canvas. The life boat is made of three-ply cypress and ash with inter-layers of canvas. The length of the machine is 74 ft. and of the boat 33 ft. AIRCRAFT has heard of no flights being made by this machine as yet.

The appropriation will include items for the purchase of reserve engines, some of which must be purchased abroad; canvas hangars, barographs and other such instruments. Provision will be made also for employing aeroplane experts and machinists.

Although this appropriation will not be sufficient to put the army on an equal footing with European nations it is the expectation of the committee that it will encourage the development of military aeronautics and put new life and energy into the aerial service.

An aviation school is provided for and will be located at any army post suitable from a climatic or atmospheric standpoint, subject to the approval of the Secretary of War.

Special provision is made for the widows of officers accidentally killed in the service, and they will be entitled to receive a year's pay at the rate to which the officer was entitled at his death.

Besides operating aeroplanes, the aviation corps will have charge also of all military air craft, including balloons and signalling devices installed in air craft of any kind. The Secretary of War will be vested with authority to assign such enlisted men to the corps as he sees fit.

CORRESPONDENCE

Editor AIRCRAFT:

I think the following figures will prove to your readers that aeroplanes many times larger than the ones in common use to-day are as efficient and economical as diminutive ones, and that the prevalent belief that aeroplanes will never carry any but the lightest loads is a fallacy.

From this table we see that the large machine is much faster than the other two, although, theoretically, the reverse should be true.

With ten and one-half times the power, Sikorsky's biplane carries fourteen times the useful weight (passengers, fuel, etc.) that the "Demoiselle" could.

With seven times as much power as the Wright racer required, the big biplane carries eleven times as much useful weight.

The Russian machine lifts more weight per square foot of supporting surface, for the same reason that a plane with a high aspect ratio is more efficient than a plane with a low aspect ratio.

A trip on the large aeroplane is to be preferred to a trip on the smaller machines, since you are enclosed in a cabin, protected from the wind and are less likely to be overturned with a sudden gust.

Of course, it is clearly understood that there is a practicable limit to the size of heavier-than-air flying machines, but apparently we have not approached it yet.

Yours truly,
JOHN JAY O'BRIEN.

COMPARATIVE TABLE	Speed	Horsepower	Weight of Passengers, Gasoline, Lubricating Oil, etc.	Total weight of machine in flight	Area of Planes
Santos Dumont's "Demoiselle" monoplane (smallest successful aeroplane)	55 m. p. h.	38	160 lbs.	464 lbs.	115 sq. ft.
Wright Biplane (1910 "Baby") (one of the smallest biplanes built)	*51 m. p. h.	60	200 lbs.	858 lbs.	146 sq. ft.
Sikorsky's Mammoth Biplane	62 m. p. h.	400	2200 lbs.	8152 lbs.	1292 sq. ft.

* This speed is the one attained by Alec Ogilvie in the 1911 Gordon Bennett race and differs much from the exaggerated estimates of the speed of the machine at Belmont Park.

Aeroplane Wanted on Every Battleship

Equipment of every battleship with at least one aeroplane, the use by the navy of dirigible balloons and the concentration of all naval aeronautical training work at Pensacola, Fla., are among the principal recommendations of the board of officers appointed by Secretary Daniels to draw up a comprehensive plan for the organization of a naval aeronautical service.

Device to Aid Flight at Night

Dr. Henry L. E. Johnson has invented a patent in the shape of a compass and inclinometer, which may be attached to any aeroplane, flying boat or dirigible and which will show at any time the position of the craft. It is designed to indicate automatically in flight the degree of angle, direction of inclination and the exact location of dip or elevation of any portion of the machine. By its use the air pilot is said to be able to maintain parallel flight and compass direction while flying at night or in fogs or clouds.

Dipping from the effects of cross winds, it is stated, can be promptly indicated, and also the compass direction whence it comes. The instrument is described as very sensitive, indestructible by ordinary usage, small, and light in weight.

Dr. Johnson agrees with Earle L. Orvington and other authorities in urging all metal construction for aeroplanes, declaring that weight will be reduced and strength increased by this practice, as in bicycle construction.

Fire at Hempstead Plains Field

Several hangars, many valuable tools and two aeroplanes were destroyed at the Hempstead Plains Aviation Field recently by a fire which it is believed was started through the upsetting of a blow-lamp which ignited oil-soaked floors. The total loss is estimated at $25,000.

Non-Professional Owners of Flying Boats

Here is a list of the pioneer sportsmen who bought flying boats just for the pleasure of flying. There will be thousands of others to follow in their footsteps as time passes along: Harold F. McCormick, Jack Vilas, J. B. R. Verplanck, William E. Scripps, Alfred W. Lawson, William Thaw, Steven MacGordon, George Von Utassy, Gerald Hanley, Elwood Doherty, Barton L. Peck, William D. Jones, Robert J. Collier, Marshall Reid.

Beachey's Loop Records

On December 25th Lincoln Beachey broke the world's record for "looping' when, at San Francisco he looped the loop five consecutive times from a height of only about 750 feet, subsequently landing in a narrow street on the Panama-Pacific Exposition Grounds.

On December 29th Beachey bettered the above record by a remarkable performance over San Francisco Bay in which, besides flying upside down, he looped the loop six times at a height of 2,500 feet.

On January 4th seven loops were made by the intrepid flyer, one being executed directly above a crowd of 20,000 persons. In another loop Beachey accomplished a "corkscrew" twist while his aeroplane was in a perpendicular position.

Another "stunt" of Beachey's was to fly around inside the Machinery Hall Building erected at the Panama-Pacific Exposition, where sufficient space was afforded for a 300-foot flight.

Wins Mackay Trophy

The Mackay Trophy, which was put up about two years ago by Mr. Clarence H. Mackay to promote aviation in the army by an annual competition among military aviators, was won on December 29th by Lieut Joseph Carberry, pilot, and Lieut. F. Seidel, observer, who located an "invading" body of troops within half an hour.

Didier Masson Very Much Alive

The circumstantial accounts of the capture and killing by the Federals at Guaymas several months ago of Aviator Didier Masson, which had wide circulation in this country and throughout Europe, have been repudiated. Dispatches from Sonora, Mexico, state with what surprise such accounts were received, not only by his many friends, but by Masson himself, who is very much alive and at present engaged in the export hide business, which he started on the proceeds from his aeroplane service.

Optimistic Maximotor Makers

The Maximotor makers of Detroit have a very optimistic outlook for the aeronautical industry this coming year, this being warranted by the fact of their having already received several good orders for spring delivery. Amongst recent purchasers of Maximotors are included Mr. Gallaudet, of Norwich, Conn., who after paying a visit to the factory and watching a Maximotor built and assembled from the ground up, ordered a Model "D" 100 H. P. Mr. Partridge, of Cicero, Ill., is another purchaser, having placed his order for a 4-cylinder 60-70 H. P. Maximotor. This concern reports that in a recent brake test of one of their 6-cylinder 100 H. P. motors by a hydro-dynamometer it pulled 111 actual brake horsepower at 1,350 R. P. M.

Passenger Airboat Service Successfully Opened

Flying boat passenger carrying service between the cities of St. Petersburg and Tampa, Fla., for which, as recorded in the January AIRCRAFT, the Benoist Aircraft Company of St. Louis, Mo., had contracted, was successfully opened on January 1. Tony Jannus, the captain of this air ferry, made the initial flight, accompanied by Ex-Mayor A. C. Pheil as passenger, from St. Petersburg to Tampa—across the bay—18 miles by the air line, making the journey in 23 minutes, or about one-quarter of the time required to make the same trip by motorboat.

This new mode of service is proving very successful and becoming more popular every day. The flying boats leave St. Petersburg daily at 10 a. m. and 2 p. m. and return from Tampa at 11 a. m. and 3 p. m. Price for single trip is $5 and $10 for the round trip, although on the opening day Ex-Mayor Pheil paid $400 at auction for the privilege of being the first passenger. A small amount of baggage is also carried at a specified pound rate.

Not only is this airboat service proving a great convenience as a time saver, but it is also arousing deeper interests in aviation among the immediate populace. At the same time the world wide publicity thus obtained for all concerned is not the least to be considered and no doubt hundreds of other enterprising townships will not allow themselves to fall far behind in the adoption of a like method of transportation for the benefit of their communities. The advantages to be derived in thus commercializing air craft are surely well worth consideration.

INDEX

This index is only for the last twelve numbers of AIRCRAFT, or Volume 4. There are three other volumes of AIRCRAFT made up of twelve numbers each, and each volume is indexed as herewith. These four volumes of AIRCRAFT contain every important thing that has taken place in the aeronautical movement during its entire history, and the student should not be without these four volumes for reference sake. As the reader of AIRCRAFT knows, we only publish the actual facts of aviation, omitting fancies usually indulged in by other magazines or newspapers.

WRINKLE'S PRESERVATIVE BALLOON VARNISH

An Elastic Non-porous Varnish for silk, linen, muslin and other fabrics used in the manufacture of

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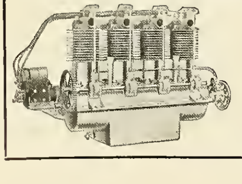

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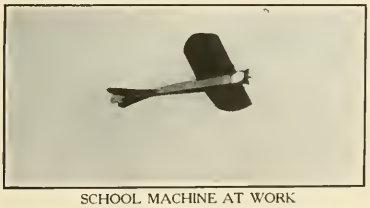

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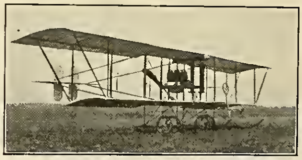

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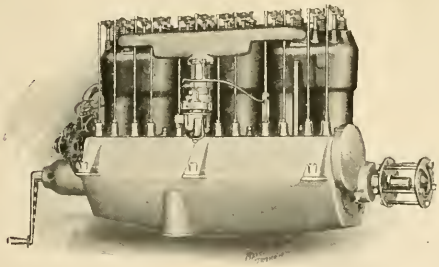

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